National Park Service
U.S. Department of the Interior

ENVIRONMENTAL ASSESSMENT

River Day Use Area and Park-and-Ride Facility • Lewis and Clark Bicentennial

Fort Clatsop

National Memorial • Oregon

Environmental Assessment
River Day Use Area and Park-and-Ride Facility
Lewis and Clark Bicentennial

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Fort Clatsop National Memorial

Astoria, Oregon

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ES.0 EXECUTIVE SUMMARY

ES.1 Project Proposal

The National Park Service (NPS) proposes to establish a new overflow parking area for the Fort Clatsop National Memorial (FOCL). This site, the River Day Use Area (RDUA), would also serve as a shuttle stop and a location for day-use activities for FOCL visitors. In addition, the NPS, in conjunction with the regional transit agency and other local agencies, proposes constructing the Fort Clatsop Park-and-Ride. This off-site park-and-ride facility would serve as a transit site for FOCL visitors throughout the Lewis and Clark Bicentennial (2003-2006) as well as a long-term shuttle facility for FOCL and other community organizations. This environmental assessment (EA) analyzes the proposed actions and alternatives, as well as their impacts on the environment.

ES.2 Background

FOCL is located in Clatsop County, Oregon, and is home of Fort Clatsop, site of the Lewis and Clark expedition's 1805-1806 winter encampment. The 125-acre national memorial will celebrate the expedition's bicentennial anniversary from 2003-2006, and anticipates a very large increase in the number of annual visitors. This EA follows several studies already completed for FOCL and the surrounding areas: the FOCL general management plan, the Lewis and Clark Shuttle Feasibility Study, and the Sunset Empire Transportation District (SETD) public transportation plan.

ES.3 Alternatives

In addition to the No-Action Alternative, three action alternatives were initially identified. However, the third alternative, RDUA/Private Site, was dismissed and replaced with a fourth—and preferred—alternative, RDUA/Dispersed Parking.

- **Alternative 1: No-Action Alternative**—This alternative provides the baseline from which development alternatives are analyzed. This alternative would not establish the RDUA or construct the Fort Clatsop Park-and-Ride. The anticipated increase in number of visitors and noise from vehicles would adversely impact the visitor experience at the fort.

- **Alternative 2: RDUA/Airport Site**—This alternative would establish the RDUA along the Lewis and Clark River and develop the Fort Clatsop Park-and-Ride at the Astoria Airport site.

- **Alternative 3: RDUA/West County Site**—This alternative would establish the RDUA along the Lewis and Clark River and construct the Fort Clatsop Park-and-Ride at the west county site located on U.S. Highway 101. Alternative 3 would be the highest-cost action alternative.

- **Alternative 4: RDUA/Dispersed Parking**—This preferred alternative would phase the development of the RDUA throughout the Lewis and Clark Bicentennial and would develop a network of existing parking areas to be served by the SETD transit system. Alternative 4 would be the lowest cost alternative.

Other alternatives were considered but dismissed. Because the development timeframe for the east county site and a nearby site that is privately owned could potentially extend into the bicentennial and cause visitor safety issues, the east county site alternative was dismissed. The RDUA/Private Site, was dismissed because it was likely to experience major delays in development as well as potential major environmental impacts.

Topics selected for analysis in this EA include:

- **Geology, Soils, and Topography**—FOCL occurs within the Astoria Basin and is on relatively level ground. Soils are varied, and ponding and flooding are primary development constraints.

- **Water Quality**—Water quality surveys indicated relatively clean and well-oxygenated fresh water with strong currents; however, toxicity equivalency concentrations suggest a source of dioxin/furans upriver from FOCL. Mitigation measures are proposed to improve water quality.

- **Ecological Resources**—No state- or federal-threatened or endangered species of flora or fauna are known to occur within FOCL. There is little possibility for the disturbance of species or habitats in the FOCL project vicinity.

- **Floodplains and Wetlands**—A small portion of the RDUA is in the 100-year floodplain. The airport site occurs within the 100-year floodplain of the Lewis and Clark River. Several wetland areas exist in the project vicinity. Wetland restoration would be incorporated in project design.

- **Coastal Zone Management**—Each of the proposed alternative sites, as well as the RDUA, occurs within the coastal zone defined by Oregon's Coastal Management Program. The majority of the area also falls within the Columbia River Estuary Planning Area. There is little possibility for disturbance within the coastal zone.

- **Prime and Unique Farmland**—There are no prime farmland soils within the county. However, the potential park-and-ride sites are all located on farmlands of statewide importance.

- **Solid and Hazardous Wastes**—Each of the action alternatives would involve some generation of solid wastes, however there are generally no known hazardous materials present at any of the alternative sites. Level I Site Assessments would be required for the RDUA. If any Park-and-Ride sites were developed, Level I would be required.

- **Visitor Use and Experience**—Visitation trends have risen over the past decades, with current visitation estimated at 250,000 persons per year. An increase in visitation is expected during the bicentennial. All action alternatives would benefit visitor experience.

- **Soundscape**—It is important to preserve the lack of noise that was present during the Lewis and Clark winter encampment. Currently, noise intrudes on visitor experience at FOCL primarily due to the proximity of the visitor center parking lot located 100 feet from the fort.

- **Lightscape**—It is important to preserve the natural ambient lightscape, despite encroaching human development, as an element of the Lewis and Clark winter encampment story.

- **Socioeconomic Factors**—Socioeconomic factors influencing the alternatives at FOCL include the socioeconomic environment, economic resources, local events, and attractions. All proposed action alternatives would benefit the local economy.

- **Transportation**—Congested roadways will become more and more prevalent as tourism opportunities in the region increase. Each of the alternatives explores ways to relieve roadway congestion and other transportation options.

- **Land Use and Zoning**—Neighboring land uses could have impacts on resource management at the 125 acre FOCL.

- **Visual Resources**—Development in the nearby vicinity of FOCL could have a substantial impact on visitor experience and the landscape within the FOCL viewsheds.

- **Infrastructure**—Development of visitor services at the proposed RDUA and Park-and-Ride facilities will improve infrastructure conditions at FOCL.

- **Air Quality**—Localized air quality at FOCL can be disturbing to visitors during peak weekends. Action alternatives analyzed in this EA would reduce localized air quality disturbances.

- **Cultural Resources**—FOCL has a rich historical background, though no archeological artifacts have been found in the area.

The environmental consequences of the previously mentioned alternatives are summarized in Table ES-1.

Table ES-1
Summary Comparison of Alternatives and Effects

Impact Topic	Alternative 1 (No-Action)	Alternative 2 (RDUA/ Airport Site)	Alternative 3 (RDUA/West County Site)	Alternative 4 (RDUA/ Dispersed Parking)
Geology, Soils, and Topography	Minor, short-term, adverse impacts; Moderate long-term, adverse impacts.	Minor, short-term adverse impacts; long-term, minor, adverse impacts.	Moderate short-term adverse impacts; Minor, long-term adverse impacts.	Moderate, short-term, adverse impacts; long-term, minor, adverse impacts.
Water Quality	Minor, short and long-term, adverse impacts.	Minor, short and long-term, adverse impacts.	Minor, short and long-term, adverse impacts.	Minor, short- and long-term, adverse impacts.
Ecological Resources	Minor, short and long-term adverse impacts.	May effect, not likely to adversely effect.	May effect, not likely to adversely effect.	May effect, not likely to adversely effect.
Floodplains and Wetlands	Negligible	Negligible impact on floodplains; Moderate, long-term, benefit to wetlands.	Negligible impact on floodplains; Moderate, long-term, benefit to wetlands.	Negligible impact on floodplains; Moderate, long-term, benefit to wetlands.
Coastal Zone Management	Negligible	Negligible	Negligible	Negligible
Prime and Unique Farmlands	Negligible	Minor, long-term, adverse impacts on farmlands of statewide importance.	Minor, long-term, adverse impacts on farmlands of statewide importance.	Minor, long-term, adverse impacts on farmlands of statewide importance.
Solid and Hazardous Wastes	Negligible	Minor, short-term adverse impacts.	Minor, short and long-term adverse impacts.	Minor, short and long-term adverse impacts.
Visitor Experience	Moderate, short and long-term, adverse impacts.	Minor, long-term, beneficial impacts.	Minor, short and long-term, beneficial impacts.	Moderate, short and long-term, beneficial impacts.
Soundscape	Moderate, short and long-term adverse impacts.	Moderate, short and long-term, beneficial impacts.	Moderate, short and long-term, beneficial impacts.	Moderate, short and long-term, beneficial impacts.
Lightscape	Moderate, short and long-term adverse impacts.	Minor, short and long-term adverse impacts.	Minor, short and long-term adverse impacts.	Minor, short and long-term adverse impacts.
Socioeconomics	Minor, short-term, beneficial impacts; Minor, long-term, adverse impacts.	Minor, short and long-term beneficial impacts.	Minor, short and long-term beneficial impacts.	Moderate short and long-term beneficial impacts.
Transportation	Moderate, long-term adverse impacts.	Moderate, long-term, beneficial impacts.	Minor, short-term adverse impacts. Moderate, long-term, beneficial impacts.	Moderate, short and long-term, beneficial impacts.
Land Use	Minor, long-term, adverse impacts.	Moderate, long-term, beneficial impacts.	Moderate, long-term, beneficial impacts.	Moderate, long-term, beneficial impacts.
Visual and Scenic Resources	Minor, long-term, adverse impacts.	Minor, long-term beneficial impacts.	Minor, long-term beneficial impacts.	Moderate, long-term beneficial impacts.
Infrastructure	Negligible, long-term, adverse impact.	Negligible	Negligible	Negligible
Air Quality	Minor, short and long-term, adverse impacts.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.
Cultural Resources	Negligible	Negligible	Negligible	Negligible

1.0 PURPOSE AND NEED

The National Park Service (NPS) proposes to construct an overflow/special event parking facility and shuttle stop on property immediately south of Fort Clatsop National Memorial (FOCL). This property is being acquired by the Fort Clatsop Historical Association (FCHA), a non-profit association. Parking at the site {River Day Use Area (RDUA)} would serve as overflow parking, a shuttle stop, and for day-use activities for FOCL visitors. The RDUA would serve visitors in the shoulder seasons (June and September) and would be used for long-term shuttle stop sites for FOCL after the Lewis and Clark Bicentennial.

The NPS is also partnering with the regional transit agency and other local agencies in proposing to design and construct a Park-and-Ride facility to jointly serve FOCL and regional parking needs associated with other recreation and tourism activities. The proposed facility would serve as the primary transit site for FOCL through the Lewis and Clark Bicentennial and would function as a long-term shuttle site for special events at FOCL and the surrounding communities.

FOCL is the location where the Lewis and Clark expedition wintered prior to its return journey east. Currently, FOCL is 125 acres in size. Resources include a replica of the fort that housed the Lewis and Clark expedition, the historic canoe landing along the Lewis and Clark River, a visitors center, park operations facilities, and over 100 acres of forested lands. In addition, FOCL is located near the Salt Works site in Seaside, Oregon. The 1995 FOCL General Management Plan (GMP) recommended a boundary adjustment to expand FOCL to 1,088 acres. The number of visitors to FOCL and other regional Lewis and Clark sites has steadily increased in recent years, and with the Lewis and Clark Bicentennial (2003-2006) approaching, it is anticipated that the number of visitors to the region would rise dramatically.

This environmental assessment (EA) includes the following specific purposes for the actions described for the RDUA:

- Reduce vehicular traffic, noise, and local air pollution that currently detract from the desired visitor experience at FOCL.
- Provide additional parking and linkage to the regional shuttle system.
- Preserve viewsheds along the Lewis and Clark River.
- Serve as an interpretive programs staging area.
- Provide for visitor day use activities not currently available at FOCL.
- Provide for a non-motorized pedestrian connection to link the RDUA to Fort Clatsop.
- Expand visitor experience throughout FOCL.

This EA includes the following specific purposes for the actions described for the Fort Clatsop Park-and-Ride facility:

- Avoid resource damage from overflow parking along FOCL and county roadways.

- Ensure that the Fort Clatsop Park-and-Ride facility is operational by the year 2004 for the beginning of the Lewis and Clark Bicentennial.
- Reduce vehicular traffic, noise, and local air pollution that currently detract from the desired visitor experience at FOCL by locating the Fort Clatsop Park-and-Ride facility outside FOCL boundaries.
- Locate the Park-and-Ride facility in close proximity to FOCL to ensure frequent service to and from FOCL.
- Improve pedestrian safety at FOCL visitor attractions.
- Educate visitors and the local population about the advantages of transit.
- Provide convenient, easily located, and safe off-site parking to accommodate FOCL visitors.
- Support overall community needs for a regional transit/shuttle transfer facility.
- Provide an appropriate transition for FOCL visitors.

The primary issue for FOCL is that neither its existing parking facilities nor the constrained regional road network will be able to handle significantly increased visitation. The large number of tourists driving to Astoria to attend the USS Missouri destroyer exhibit caused severe traffic jams and safety hazards due to backups on narrow two-lane highways that lead to the area's bridges. The limited number of bridges can create a "bottleneck" effect on traffic flow. FOCL has two small parking lots adjacent to the visitor center with a total capacity of 50 vehicles. The lot closest to the visitor center is the area where charter buses drop off passengers and school children. This parking lot is also very close to the historic fort and the noise and diesel emissions of the buses and the noise of passengers loading and unloading are disruptive to other visitors' experience of FOCL.

The road leading through FOCL is very narrow—two lanes with no shoulders—making it difficult for cyclists and pedestrians to access. Due to the sensitive nature of the surrounding dense forest, FOCL will not widen this road. Local traffic uses the road often at high speeds, for through travel. As a result, transit, pedestrian, and bicycle access to the core of FOCL need to be carefully planned.

Timing is critical in the selection of an off-site location for the regional Fort Clatsop Park-and-Ride facility since there is minimal lead time for design and construction prior to 2004 when visitation will begin to peak. In light of this, this facility needs to be compatible with existing local zoning and land use, have minimal impact on the natural and built environments, be free of contaminants, and have utility access. The Fort Clatsop Park-and-Ride facility site needs to be compatible with existing traffic control and patterns. It also needs to be close to U.S. 101—the primary regional highway—while in close proximity to FOCL to maintain the sense of entry into FOCL.

The visitor experience must be balanced with the functional needs of a regional park-and-ride, proposed development costs, and the permanence of the facility. The NPS determined that the sense of entry or visitor experience to FOCL needs to be incorporated into the site character and approach to the Fort Clatsop Park-and-Ride facility and RDUA. The overflow/special event

parking at the RDUA should be in close proximity to FOCL to minimize travel time and enhance the interpretation of the natural and cultural resources at FOCL.

If the projected need for additional parking is not addressed, visitor experiences at FOCL during the Lewis and Clark Bicentennial and beyond would be degraded by on-site traffic congestion, unauthorized parking along roadways, increased localized air pollution at FOCL, and increased noise from the visitor center parking lot. All of these factors interfere with interpretive programs and individual visitor sense-of-place experiences.

This EA analyzes the proposed action and alternatives and their impacts on the environment; it has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (40 CFR 1508.9). The RDUA was not a major component of the GMP at the time of the last update; therefore, the proposed action, if approved, would be a minor revision to the FOCL GMP/FEIS, which was completed in 1995. This EA intends to clarify and amplify the direction provided in the approved plan. Most notably, the proposed action would be consistent with recommendations for protection of FOCL resources, increase interpretation of FOCL resources and partner with regional agencies on alternative transportation strategies.

2.0 BACKGROUND

2.1 Project Background and Scope

Continually increasing visitation and changes in the types and sizes of vehicles entering FOCL have led to congestion in parking areas, visitor frustration, and the potential for damage to natural and cultural resources. During the upcoming bicentennial of the Lewis and Clark expedition (2003-2006), NPS expects that FOCL and the surrounding Lewis and Clark sites are expecting a dramatic increase in visitation and subsequent traffic congestion. FOCL, as well as the surrounding communities, face unique transportation challenges along with unique opportunities to demonstrate the advantages of public transit to the visiting public and to community residents.

FOCL is located in Clatsop County, Oregon (see Figure 1). The City of Warrenton's growth boundary is one mile to the north of FOCL, and the City of Astoria is six miles east and slightly north from FOCL. The City of Portland, Oregon, is about 100 miles to the southeast of FOCL, and the City of Seattle, Washington, is about 185 miles to the northeast. FOCL is located in a community setting with bottleneck access points due to the extensive river system in the area. Astoria is surrounded by water on three sides, with two-lane bridges providing access to Washington and the Oregon coast. FOCL is located south of the Youngs' Bay Bridge that links U.S. 101 and U.S. 30 along the Oregon coast.

The community of Warrenton is west of FOCL. The coastal area and nearby Fort Stevens State Park are extremely popular with tourists and Washington and Oregon residents alike. The coastal areas of south Washington and northwest Oregon has a transit system that provides connections to the historic and recreational sites; however, most tourists use their cars and recreational vehicles. FOCL visitation grew from 100,000 in 1980 to over 262,000 in 1990. Visitation peaked in 1991 at 280,000 with the opening of new sites associated with the Oregon Trail celebration and new tourist facilities on the coast. FOCL reaches this capacity in the summer months. The NPS projects that visitation will rise dramatically in conjunction with the Lewis and Clark Bicentennial and the planned activities associated with its celebration in its designated years (2003 to 2006). When the USS Missouri, a World War II destroyer was showcased in Astoria, far greater numbers of visitors came then were projected. Astoria's road network was completely overwhelmed with massive traffic jams. There was also inadequate parking and insufficient traffic control. This experience has galvanized the community and state and local governments to identify and implement necessary solutions to assure that this situation does not reoccur. The NPS estimates that a total of 400,000 to 500,000 annual visitors are likely to visit FOCL during the Lewis and Clark Bicentennial. FOCL is also receiving increasing numbers of large tour groups that overwhelm the staff and facilities. Buses parked in the visitor center parking lot continue to idle, which results in a background noise and diesel fumes close to the fort.

The Lewis and Clark Shuttle Feasibility Study, prepared in 2000 for the Lewis and Clark Transportation Committee, reviewed existing transportation systems, services, and facilities and identified the need for additional parking facilities and shuttle services to accommodate the anticipated increase in FOCL visitation. Existing transit service in the region is provided by the Sunset Empire Transit District (SETD). Pacific Transit offers commuter service along the south coast of Washington, which extends to Astoria. The SETD operates bus routes to Fort Stevens State Park and south of Cannon Beach (see Figure 2). The study identified the need for a short shuttle link from a proposed Fort Clatsop Park-and-Ride facility that is near enough to transport Lewis and Clark Bicentennial visitors to FOCL and connect this small historic memorial to an expanding regional transit network. FOCL is also proposing to develop a smaller parking lot

and shuttle stop on the FCHA site south of the current FOCL boundary. This proposed development is called the River Day Use Area. SETD recently received $1.9 million in Federal Transit Administration bus and bus-related capital support in anticipation of the Lewis and Clark Bicentennial and the subsequent increased visitation to FOCL. The transit agency would operate and maintain a shuttle service to and from FOCL, the Fort Clatsop Park-and-Ride, and the RDUA during the Lewis and Clark Bicentennial. After the Lewis and Clark Bicentennial, the shuttle to and from FOCL would be operated as needed during high-visitation seasons and special events. The Fort Clatsop Park-and-Ride facility could be used as a long-term transit link within the SETD system.

FOCL is in the process of acquiring approximately 70 acres of land from the FCHA. This land is adjacent to and south of FOCL along both sides of the Lewis and Clark River. FCHA's intention is to add this land to FOCL, to help ensure compatible public land uses adjacent to the FOCL, to prevent incompatible development, and to protect the historic river approach route to the fort. A portion of this site, on the west side of the Lewis and Clark River, could be developed as the RDUA to provide for appropriate FOCL visitor use needs.

2.2 Park Purpose and Significance

The historic site of FOCL was first preserved and protected under the jurisdiction of the Oregon Historical Society before its inclusion in the National Park System. The memorial was authorized for establishment by Act of Congress (Public Law 85-435, 72 Stat. 153) and was signed into law on May 29, 1958, by President Dwight D. Eisenhower. This act established the memorial:

> *"For the purpose of commemorating the culmination, and the winter encampment, of the Lewis and Clark expedition following its successful crossing of the North American continent."*

The act further added that development was to include:

> *...land and improvements thereon located in Clatsop County, Oregon, which are associated with the winter encampment of the Lewis and Clark expedition, known as Fort Clatsop, and also, adjacent portions of the old trail which led overland from the fort to the coast.*

NPS' 1916 Organic Act (39 Stat. 535) also provides a basis for public use and enjoyment as a component of the park's purposes.

The Salt Works site was a later addition to FOCL, authorized by Act of Congress (Public Law 95-625, 92 Stat. 3478), which was signed into law on November 10, 1978.

The memorial's mission and purpose were derived from these legislative authorities and the June 1995 GMP, which form the basis for management decisions. The mission is to:

> *Commemorate and preserve the story and significance of the Lewis and Clark expedition and the site of its 1805-1806 winter encampment. The park environment reveals the accomplishments, courage, fortitude, and daily lives of the explorers and the native people they encountered. The park experience provokes environmental awareness and appreciation of the historical, scientific, and cultural values of the expedition and inspires in visitors an explorer's sense of discovery.*

Figure 1
Vicinity Map

Figure 2
Existing Transit Service

The purpose of Fort Clatsop is highlighted in the following statements:

- Fort Clatsop was set aside by Congress to recognize the important scientific contributions and cultural contacts the Lewis and Clark expedition made during its exploratory journey to the Pacific Ocean and back to the United States and to relate to the nation the story of their winter encampment of 1805-1806.

- Fort Clatsop preserves and provides the opportunity for visitors to safely experience and understand the complex and inspirational human and environmental interrelationships of the Lewis and Clark expedition: its daily life and challenges and the historical significance of the successful journey.

- Fort Clatsop preserves, protects, and restores the natural and cultural resources of the park that represent the setting of the 1805-1806 winter encampment of the Lewis and Clark expedition.

- Fort Clatsop interprets the story and significance of the Lewis and Clark expedition and its relationship to the landscape surrounding Fort Clatsop.

The following significant statements highlight the cultural and natural resources associated with FOCL:

- Fort Clatsop is the site at the confluence of the Columbia River and Pacific Ocean where the Lewis and Clark expedition camped for 3½ months after successfully crossing the continent.

- While camped at Fort Clatsop, Lewis and Clark and other expedition members documented their interaction and cooperation with the Chinook, Clatsop, and other local Indians.

- Fort Clatsop may contain the highest potential in America for archeological evidence of the Lewis and Clark expedition.

- Fort Clatsop and its associated sites and routes preserve a portion of the natural and cultural environment that was an integral and unique component of the Lewis and Clark expedition's experience.

- During their journey, the members of the Lewis and Clark expedition accumulated important scientific, cultural and geographic information. Fort Clatsop is where the explorers compiled this data into journals and maps and planned their strategy for a successful return to the United States. Thus their winter at Fort Clatsop became a significant part of the foundation for American claims to the Northwest and helped to "open" the West to subsequent immigrants.

2.3 Relationship to Other Planning Documents

The proposal of establishing a River Day Use Area and Fort Clastop Park-and-Ride has a direct relationship with two significant planning projects: the GMP for FOCL and the SETD public transportation plan. The FOCL GMP, which was completed in 1995, analyzes alternatives for management actions to be taken at FOCL. The recommendations in the FOCL GMP that have a direct relationship to the proposed RDUA and Park-and-Ride facility include natural and

cultural resource management, regional collaboration, and enhancement of visitor experience. Boundary expansion of FOCL, which is part of the Preferred Alternative, would increase protection of natural resources at FOCL and incorporate development of the pedestrian trail from the fort to the ocean. The recommended FOCL boundary adjustment would be an important element of accomplishing the goals of natural and cultural resource protection. Boundary adjustment would also be required for establishment of the trail from the fort to the ocean. Regional cooperation initiatives recommended in the GMP include taking a principal role in planning and coordinating the events surrounding the Lewis and Clark bicentennial. This EA tiers off of the 1995 GMP/FEIS. The Record of Decision for the GMP/FEIS was signed on September 20, 1995.

The SETD public transportation plan describes the need for increased multi-modal transportation options for Clatsop County residents and the opportunity to improve transit access to regional tourist attractions (to help reduce the number of automobiles on U.S. 101 and U.S. 30).

The proposed development of the RDUA and Fort Clatsop Park-and-Ride would meet several goals in the FOCL GMP and the SETD public transportation plan including increasing regional cooperation, improving access to regional tourist attractions, increasing transit options for county residents, protecting and enhancing natural and cultural resources, and enhancing visitor experience at FOCL. This proposal is consistent with both plans and management direction.

2.4 Issues and Concerns

The issues associated with the development of the RDUA and the Fort Clatsop Park-and-Ride facility have been identified through numerous efforts of coordination including public and government agency meetings, letters, and memos with federal, state, and local governments; the general public; and local Native American groups. The key issues that were identified as a result of these coordination efforts are:

- During the bicentennial, the number of visitors to FOCL will increase dramatically. Anticipated increases in visitation would likely exceed capacities at FOCL parking lots and at the visitor center.
- The Lewis and Clark bicentennial is a regional and national event that will result in an increase in regional traffic congestion.
- Time is a critical element in the development of this project.
- There will be a long-term need for parking facilities in the region.
- It is less likely that visitors would use a parking facility if it is a long distance from FOCL.
- A regional parking facility should not just be a big slab of concrete.
- Visitors to FOCL would likely enjoy having other activities to do before and/or after their visit to the park.
- The roads leading to FOCL are already congested at times and the situation will only get worse. Traffic congestion also leads to increases in traffic accidents.

- There is a wealth of natural resources in the region that need to be protected. The Lewis and Clark River, natural landscapes and abundant wetlands are just a few of the resources that need to be protected.

2.5 Impact Topics Selected for Detailed Analysis

Impact topics are the resources of concern that could be affected by the range of alternatives. Specific impact topics were developed to ensure that alternatives were compared on the basis of the most relevant topics. The following impact topics were identified on the basis of federal laws, regulations, orders, and NPS Management Policies, 2001.

2.5.1 Geology, Soils, and Topography

Each of the action alternatives impact topography and soils to some degree. Action alternatives would require clearing and grading for adequate parking. Fill material may be required for some action alternatives. Potential soil erosion concerns occur for any action alternative.

2.5.2 Prime and Unique Farmlands

There are no prime farmland soils designated within Clatsop County. However, Alternatives 2 and 3 occur (at least in part) on soils designated as farmlands of statewide importance.

2.5.3 Water Quality

Each of the action alternatives involve site clearing and grading which may result in soil erosion and siltation into adjacent surface waters. The Lewis and Clark River and the Skipanon River are the principal waterways that could be affected by the proposed project. Additionally, post-construction concerns include an increase in the quantity and a decrease in the quality of storm water runoff, which would carry increased loads of oils, greases, metals, etc.

2.5.4 Floodplains and Wetlands

Floodplains occur across two of the three action alternative sites, as well as the RDUA. Consequently, regulatory guidance given in Executive Order 11988 (Floodplain Management) would be adhered to for development of the proposed action. Similarly, wetlands occur on two of the action alternative sites as well as the RDUA. Therefore, as per Executive Order 11990 (Protection of Wetlands), and Section 404 of the CWA the proposed action must comply with this regulation by avoiding, minimizing, and mitigating impacts to wetlands.

2.5.5 Coastal Zone Management

Each of the proposed alternative sites, as well as the RDUA, occurs within the coastal zone, (specifically, the Columbia River Estuary portion of the coastal zone) defined by Oregon's Coastal Management Program (OCMP). The Columbia River Estuary planning area includes aquatic areas and shorelands from the 3-mile limit offshore to the eastern boundary of Wahkiakum County in Washington (RM 53) and the eastern boundary of Clatsop County in

Oregon (RM 45). All tributary streams to the head of tide and their adjacent shorelands are included within the estuary planning area.

2.5.6 Ecological Resources (Including Threatened and Endangered Species)

Each of the action alternatives involves site clearing and grading of both herbaceous and woody vegetation. Subsequent disposal of woody waste is a concern. The potential for threatened and endangered species on each of the Park-and-Ride facilities is likely very low as these sites are somewhat disturbed from past activities. There is potential for threatened and endangered species in the vicinity of the RDUA and potential Park-and-Ride sites. Consequently, each of the action alternative sites would require screening for protected species prior to final design and site selection.

2.5.7 Visitor Use and Experience

Each of the action alternatives would result in a reduction of vehicular traffic for visitors to FOCL, thus enhancing the visitor experience. The RDUA and the Park-and-Ride facility would provide visitors a new opportunities to transition into the interpretation of the Lewis and Clark story of their winter encampment at FOCL. Some degree of the interpretation would begin at the RDUA and/or parking facility. Development of the RDUA would provide new opportunities to introduce visitors to natural and historical interpretive themes not currently available that would enhance visitor experience through viewing the Lewis and Clark River valley landscape.

2.5.8 Soundscape Management

In accordance with NPS Management Policies (2001) and Director's Order #47, Sound Preservation and Noise Management, an important part of the National Park Service mission is preservation of natural soundscapes associated with national park units. One of the important elements of the Lewis and Clark expedition's winter encampment at FOCL was the almost complete absence of human caused noise. Currently, noise intrudes on visitor experience at FOCL primarily due to the proximity of the visitor center parking lot, which is approximately 100 feet from the historic fort.

2.5.9 Lightscape Management

In accordance with NPS Management Policies (2001), the NPS strives to preserve natural ambient landscapes, which are natural resources and values that exist in the absence of human caused light. Another important element of the winter encampment was the absence (outside of the fort) of human caused light at FOCL.

2.5.10 Socioeconomic Factors

FOCL is a major tourist attraction in the Astoria/Warrenton region. Each of the action alternatives could facilitate visitations to FOCL and encourage additional tourism throughout the region.

2.5.11 Solid and Hazardous Wastes

Each of the action alternatives involves site clearing and grading of both herbaceous and woody vegetation. Subsequent disposal of woody waste is a concern. There are no known hazardous materials present on any of the alternative Park-and-Ride sites or the RDUA. However, the Astoria Airport site has been previously developed and the RDUA was previously utilized for logging operations. It is likely that a Phase I Site Investigation would be required for these sites.

2.5.12 Transportation

Roadways in the region are congested and it is anticipated that there would be an increase in the number of vehicles traveling these roads as tourism opportunities draw more people to northwest Oregon.

2.5.13 Land Use and Zoning

FOCL is only 125 acres in size, which means that neighboring land uses could have impacts to resource management at the memorial.

2.5.14 Visual Resources

Visual resources are a component of the visitor experience and the cultural landscape of the Lewis and Clark expedition. Development in the vicinity of FOCL could impact this resource.

2.5.15 Infrastructure

Development of visitor services at the proposed RDUA and Park-and-Ride facilities will require minimal infrastructure connections.

2.5.16 Air Quality

Although population of the region and industrial development are not anticipated to dramatically increase, automobile traffic is anticipated to increase due to increased tourism. Localized air quality at FOCL can be disturbing to visitors during peak weekends when buses are idling in the visitor center parking lot.

2.5.17 Cultural Resources

Cultural resources at the action alternative sites are likely minimal; however, cultural resource surveys were conducted to meet Section 106 requirements.

2.6 Topics Dismissed from Further Analysis

2.6.1 Environmental Justice

Under a policy established by the Secretary of the Interior to comply with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, departmental agencies should identify and evaluate, during the scoping and/or planning processes, any anticipated effects, direct or indirect, from the proposed project or action on minority and low-income populations and communities, including the equity of the distribution of the benefits and risks. The proposed development of the RDUA and Fort Clastop Park-and-Ride would not have disproportionate health or environmental effects on minorities or low-income populations or communities, no residential structures would be taken by this proposed action, and no business that may employ minorities would be adversely effected. The SETD regional shuttle that could be used by minorities and low-income persons would continue to operate whether this proposed action were implemented or not. The topic of environmental justice is not discussed in detail in this EA.

2.6.2 Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources in FOCL. The lands comprising the monument are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian trust resources were dismissed as an impact topic.

2.7 Applicable Regulatory Requirements and Coordination

This EA was prepared to evaluate the impacts of the reasonable alternatives described in Section 3.0. The EA is formatted in accordance with NPS-Director's Order 12, National Environmental Policy Act Guidelines and the provisions of the NEPA of 1969 (PL 91-190, 42 USC 4321-4247). Detailed procedures for developing this document comply with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508).

Regulatory requirements, which may be applicable to the activities addressed in this EA, include:

- Section 106 of the National Historic Preservation Act, which addresses any activity that directly, indirectly, or cumulatively with other actions may impact cultural resources listed on or eligible for listing on the National Register of Historic Places

- Section 404 of the Clean Water Act, state water quality certification through Section 401 of the Act

- Section 10 of the Rivers and Harbors Act of 1899, related to placement of fill in navigable waters

- Oregon's Coastal Zone Management Act (CZMA), requiring a consistency determination through Oregon's coastal zone management program

- Section 7 of the Endangered Species Act, consultation with the U.S. Fish and Wildlife Service, on any issues impacting federally listed threatened or endangered species

- Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands); however, actions that are functionally dependent on water are exempted from compliance with these orders under NPS final procedures

3.0 ALTERNATIVES

3.1 Alternatives

As a result of the early scoping process, which included public meetings and coordination with state, local and federal agencies, four alternatives were initially scoped and identified for this EA. The alternatives being evaluated include:

- Alternative 1: No-Action Alternative
- Alternative 2: RDUA and the Astoria Airport Park-and-Ride site
- Alternative 3: RDUA and the West County Park-and-Ride site
- Alternative 4: RDUA and Dispersed Parking

During the evaluation of these alternatives it was determined that the RDUA and the Private Site alternative would not meet the needs or goals of this project and was subsequently dismissed from further consideration. Further discussion on the reasons that the RDUA and Private Site was dismissed from further consideration is presented in Section 3.1.5.

The proposed program is the same and the location of the RDUA does not change for Alternatives 2, 3, or 4. The development proposals for the Park-and-Ride sites for Alternatives 2 and 3 would contain the same features, but there would be some variations in the design to best fit the proposed site locations, land use regulations and natural and cultural resource constraints.

The constant coordination with state, local and federal agencies during the evaluation process resulted in the identification of a new alternative to be evaluated. Alternative 4: RDUA and Dispersed Parking was added as an alternative to be evaluated and has been determined to be the Preferred Alternative and the Environmentally Preferred Alternative.

The proposed development concepts for Alternatives 2 and 3 include the same features. The differences between alternatives are related to site layout dictated by site constraints noted above. To minimize redundancy in the description of alternatives, the development proposals for Alternatives 2 and 3 are discussed in detail in Alternative 2. Only the difference related to site location are presented for Alternative 3. Alternative 4, the Preferred Alternative and Environmentally Preferred Alternative is described in detail.

The location of the proposed locations for Alternatives 2, 3, and 4 are illustrated in Figure 3. A summary impact comparison matrix for all alternatives considered in this EA is presented at the end of this section.

3.1.1 Alternative 1—No-Action Alternative

The No-Action Alternative provides the baseline from which development alternatives are analyzed. The No-Action Alternative would not establish the RDUA or construct the Fort Clatsop Park-and-Ride for tourists traveling by car or bus to FOCL. A new shuttle stop and associated day use activities would not be constructed at the RDUA.

If the No-Action Alternative is implemented, visitors to FOCL would continue to drive automobiles to the existing visitor center parking lots, which are approximately 100 feet from the fort. With the anticipated increase in visitation during the bicentennial, the No-Action Alternative would result in demand for parking that would exceed supply at the visitor center

parking lot, which could lead to visitors parking in unauthorized locations along park roadways and elsewhere damaging resources and creating a safety hazard. Buses would continue to drive to the front entrance of the visitor center to drop off and pick up visitors. The visitor experience would begin at the entrance to FOCL and the first contact with NPS rangers and interpretive staff would be at the visitor center. Management of visitors would continue within its current framework where visitors arrive at the visitor center at any time of the day.

A new Park-and-Ride may not be constructed without the proposed NPS partnership. The SETD may pursue construction of a Park-and-Ride facility to serve tourists and local residents; however, the facility would not provide opportunities for early contact with NPS rangers or interpretive staff.

3.1.2 Alternative 2—River Day Use Area/Airport Site

Alternative 2 is proposed to establish the RDUA along the Lewis and Clark River, south of FOCL—which is constant for all alternatives—and develop the Fort Clatsop Park-and-Ride at the Astoria Airport site. Alternative 2 is illustrated in Figure 4.

3.1.2.1 River Day Use Area

The RDUA is an approximately 70-acre site located along the Lewis and Clark River, directly south of FOCL. The 70-acre site includes land on both sides of the river. Most of the proposed area (55 acres) would not be developed. The undeveloped land on both sides of the river would remain as open space to retain the natural viewshed from the FOCL canoe landing site and to protect FOCL from encroaching development. Approximately 15 acres on the west side of the river would be developed for the shuttle stop, parking, and day-use activities. The portion of the site to be developed for day use activities was formerly used as a log transfer facility for a private logging company. The proposed concept for the RDUA includes a shuttle stop for overflow/special event parking for automobiles, buses, and recreational vehicles; shoulder season overflow parking; and as a long-term transit facility for FOCL beyond the time of the Lewis and Clark Bicentennial. There would be construction of 40 parking spaces for automobiles and four spaces for buses or recreational vehicles. The shuttle stop would provide service to the Fort Clatsop Park-and-Ride facility. During peak and non-peak periods, the area could serve as an interpretive program staging area for FOCL (primarily for large groups such as school children and other bus tours). Other proposed facilities at the developed portion of the RDUA are picnic facilities, including a small group picnic shelter; public non-motorized river access for canoes, kayaks, and other watercraft; possible motorized watercraft access, a trailhead with shelter; and a river overlook.

Future development of a replica longhouse and activity shelter is also proposed by the NPS. This would provide a site for the park to interpret Native American culture in the area including the interaction of the Lewis and Clark expedition in the lower Columbia region with the Clatsops, Chinooks, and other native persons. It would also further the park's educational programs and provide opportunities for special events and activities. Three locations are being considered by the NPS: the north association property north of the fort, a site in proximity to the proposed RDUA, and a site located across the Lewis and Clark River from the RDUA. Further site analysis is required and would be conducted in a separate study by the NPS to determine the most advantageous and suitable location for this function. Close coordination with area tribes and citizens will be important in the siting and development of this structure.

Figure 3
Facility Alternatives

Figure 4
Alternative 2—Airport Site and Proposed Community Parking Facilities

A 3,100 lineal foot non-motorized pedestrian connection is also being proposed to link the RDUA with the historic canoe landing at FOCL. This connection would serve several functions. The pedestrian connection would provide options for visitor dispersal including pedestrian access to the historic canoe landing and fort, opportunities for interpretation of natural resources, and viewing the natural landscape of the Lewis and Clark River valley. Approximately 1,700 feet of the pedestrian connection would be constructed on an existing dike along the river. The remaining distance to the FOCL canoe-landing site would require the construction of a boardwalk along the riverbank. This area would also provide safe access to the Weyerhauser Forestry Interpretive Trail, which is located across Fort Clatsop Road from the RDUA.

The FCHA intends to purchase this land and then transfer it to FOCL. The RDUA was not addressed in the FOCL GMP of 1995. This EA would constitute a minor revision to the 1995 GMP/EIS for FOCL. The EA would clarify and amplify the direction provided in the approved plan. Most notably, the proposed action would be consistent with recommendations for protection of FOCL resources, increase interpretation of FOCL resources, and partner with regional agencies on alternative transportation strategies.

3.1.2.2 Fort Clatsop Park-and-Ride

To accommodate anticipated increases in visitors to FOCL and the region, the NPS and local community partners are proposing to construct off-site facilities that may accommodate up to 500 automobiles and parking for up to 15 buses and/or recreational vehicles. The parking needs for FOCL visitors and staff would account for approximately 120 of the 500 spaces. The balance of the parking spaces would accommodate visitors and commuters using the regional transit system. The proposed Fort Clatsop Park-and-Ride facility would be approximately 10 to 20 +/- acres in size. Construction of the transit shuttle facility may be phased in over a number of years, depending on parking demand. The NPS would provide funding for construction of 120 of the parking spaces. The partnership for this Fort Clatsop Park-and-Ride facility would allow visitors to FOCL to travel to other Lewis and Clark sites, regional recreation sites, and other coastal communities. The Fort Clatsop Park-and-Ride facility would be the beginning of the experience for visitors to FOCL. Gateway signage that would provide visual icons to associate the site with FOCL and for local commuters using the facility. Landscaping around the facility would provide visual buffers from surrounding land use and begin to provide a transition to the natural conditions at FOCL. Small structures would be built at this facility to accommodate personal needs of visitors and to provide information on Fort Clatsop and the region. Visitors would buy park passes, make reservations for admittance to FOCL and begin the process of learning the story of the Lewis and Clark encampment through interpretive signage, reading materials, and discussions with interpretive rangers.

As noted previously, the RDUA is a constant element for all action alternatives and the location does not change. The proposed Alternative 1 Fort Clatsop Park-and-Ride site would be located at the Astoria Airport. The site is currently in an undeveloped portion of the airport that is slated for general commercial or industrial use. The site was previously developed as part of the Astoria Naval Air Station. The airport is approximately two miles north of FOCL. Access to the airport site would be from U.S. 101 and Airport Road.

The projected costs for the development of the RDUA alternative would range from $1,004,000 to $1,808,000. The projected cost for the Fort Clatsop Park-and-Ride at the airport site would range from $1,674,000 to $2,898,000. The projected total cost for Alternative 2 would range from approximately $2,678,000 to $4,706,000.

3.1.3 Alternative 3—River Day Use Area/West County Site

Alternative 3 would establish the RDUA along the Lewis and Clark River and construct the Fort Clatsop Park-and-Ride at the west county site, which is located on U.S. 101 (see Figure 5). The RDUA concept and location is exactly the same as in Alternative 2. The elements of the Fort Clatsop Park-and-Ride facility would be nearly the same as Alternative 2. There would be minor differences in the design of the facility because of its proximity to U.S. 101 and wetlands in the vicinity. Due to land constraints, the facility would be divided into two parking lots for automobiles. Because this site is within the City of Warrenton Water and Sewer District, which has a moratorium on new connections, vault toilets and wells would be required to provide services to visitors.

The west county site is located on the west side of the North Coast Business Park, which is owned by Clatsop County but located within the City of Warrenton. U.S. 101 forms the western boundary of the site. The site is slightly farther from FOCL than the other action alternatives.

The cost to develop the RDUA is the same as Alternative 2. The cost to develop the Park-and-Ride facility at the west county site would range from $1,766,000 to $3,202,000. The total cost to develop Alternative 2 would be approximately $2,770,000 to $5,010,000. Alternative 3 would be the highest-cost action alternative.

3.1.4 Alternative 4—River Day Use Area/Dispersed Parking (Preferred Alternative)

Alternative 4 was identified through coordination with project partners, federal, state, and local agencies during the process of preparing the draft environmental assessment for the RDUA and Park-and-Ride facility. This proposed concept was derived from the need to have the alternative transportation project in operation before the bicentennial. Coordination with project partners, local officials, state and federal agencies resulted in the determination that factors beyond the scope of this project would likely result in delays to the implementation of Alternatives 2 or 3. The project partners determined that another alternative should be considered. Figure 6 illustrates the overall concept of Alternative 4.

The requirement for implementation of a typical reservation system and ITS for FOCL visitors—which is a common element of all action alternatives—is even more critical for Alternative 4, because visitor parking would be located at several locations in the region. This alternative differs from Alternatives 2 and 3 by proposing an increase in the number of parking spaces at the RDUA and a stronger reliance on existing parking areas including the cities of Seaside and Astoria, along with the increased transit service to serve FOCL from those remote parking areas.

3.1.4.1 River Day Use Area

The proposed development would include construction of two parking areas, limited bus and recreational vehicle (RV) parking, a shuttle bus stop and shelter, day use activity area and a pedestrian connection to the fort. Figure 7 illustrates the proposed development concept for the RDUA. During the bicentennial, all visitors attempting to park at the RDUA during peak visitation season (Memorial Day to September 30th) will be required to have previously purchased an entrance ticket to FOCL. There would be very limited bus and RV parking allowed at the RDUA during the bicentennial. The primary parking lot would provide a

Figure 5
Alternative 3—County Site and Proposed Community Parking Facilities

Figure 6
Alternative 4—Preferred River Day Use Area
and Proposed Community Parking Facilities

Figure 7
Alternative 4—Preferred River Day Use Area
Conceptual Layout During and After Bicentennial Event

maximum of 120 parking spaces for automobiles throughout the central portion of the RDUA. The surface of the proposed parking lot would be paved or gravel, or a combination of both.

Forty permanent parking spaces would be paved. Up to 80 additional parking spaces, if needed, would be gravel or some other pervious materials. The second automobile parking lot would be a permanent parking area for 20 automobiles and a 10-car "overflow" parking area on the south end of the RDUA. The permanent parking would be paved and the proposed overflow parking lot could be constructed with gravel or other pervious material. The entrance road from Fort Clatsop Road to the RDUA would be paved. The FOCL bus shuttle stop would be located at the northern end of the RDUA. The proposed shuttle stop would consist of an entrance along Fort Clatsop Road, which would connect to a short, paved loop road and a visitor staging area. The visitor staging area would include an open-air shelter with benches and a vault toilet for visitor comfort. Interpretive materials about FOCL and the history of the RDUA would be provided at the shelter. The visitor staging area at the bus shuttle stop would be enhanced with construction of a river overlook that would incorporate interpretive materials. The proposed river overlook would be constructed at the location of a concrete bulkhead on the riverbank. This concrete bulkhead was constructed for the former logging operations at this site. The river overlook would also be the location for a proposed dock for a "water-taxi." The "water-taxi" would be operated by a local company and would provide motorized water access from Astoria.

The proposed pedestrian trail connection from the RDUA to the historic canoe landing at FOCL would be the same as that described for Alternatives 2 and 3. This pedestrian connection would provide a broader range of visitor activities and areas for visitor dispersal. The shuttle bus stop and shelter would also serve as the trailhead for the pedestrian connection.

Depending on the annual visitation to FOCL following the bicentennial, much of the gravel parking area may be removed. Although the visitation would likely drop following the peak years of the bicentennial, it is anticipated that there would likely be an on-going annual increase in visitation—from current levels—due to the exposure that FOCL will get nationwide before and during the bicentennial. To accommodate the anticipated increase in visitors post-bicentennial, at least 40 automobile parking spaces will remain at the RDUA to be used in combination with parking at the FOCL visitor center on peak weekends. A portion of the parking area could be paved to accommodate up to four buses and a limited number of RVs.

Day use activities would be encouraged in the southern portion of the RDUA with the proposed construction of picnic tables, a group picnic shelter, a canoe landing and staging area, a vault toilet, a VIP trailer site, irrigation system, signage, lighting, bicycle racks, and utilities.

The FCHA intends to purchase this land and then transfer it to FOCL. The RDUA was not addressed in the FOCL GMP of 1995. This EA would constitute a minor revision to the 1995 GMP/EIS for FOCL. The EA would clarify and amplify the direction provided in the approved plan. Most notably, the proposed action would be consistent with recommendations for protection of FOCL resources, increase interpretation of FOCL resources, and partner with regional agencies on alternative transportation strategies.

3.1.4.2 Dispersed Parking

The common element between Alternative 4 and the other action alternatives is that no parking would be allowed at the FOCL visitor center during the bicentennial. The difference between this alternative and the other action alternatives is that partnering with the SETD would result in utilization of existing parking facilities throughout the region, along with more parking at the

RDUA, to develop a network of parking facilities that are part of the existing SETD transit system. The primary parking area for FOCL visitors would be the RDUA that is planned to accommodate a maximum of 120 cars (with very limited RV parking). Other existing parking areas that could be utilized for FOCL visitor parking are the intermodal transit center in downtown Astoria, parking lots in downtown Seaside, and for special events, the Astoria High School parking lot. The intermodal center, which could accommodate an additional 50 vehicles destined for FOCL, would be an alternative ticketing/reservation site for FOCL. Visitors that park at the intermodal center or other downtown locations would ride one of the Lewis and Clark Shuttle system buses to FOCL. Astoria High School would only be used during peak visitation periods when school is not in session. Visitors would be directed to obtain FOCL visitor information when arriving in Seaside or Astoria. Visitors would then become aware of the reservation system and the shuttle bus options to plan their visit to FOCL. Visitors driving RVs would be encouraged to use one of these dispersed parking facilities or to take a shuttle bus from their campsite. To accommodate the dispersed parking alternative during the bicentennial, the SETD would expand its shuttle system and increase the frequency of shuttle stops by adding shuttle buses. The proposed expansion is explained in detail in the Lewis and Clark Feasibility Study, October 2000. The following is a summary of the expansion:

- Expand the Seaside to Astoria (FOCL) service on Route 101 to 30 minute frequencies.
- Expand the Warrenton and Astoria service to include links to FOCL.
- Establish the Ecola shuttle from Tolovana Wayside to Ecola State Park, including Indian Beach when parking at Ecola State Park exceeds capacity.
- Establish a Fort Clatsop Shuttle that would operate between the Park-and-Ride (Alternatives 2 and 3), RDUA, and Fort Clatsop. In Alternative 4, the Fort Clatsop Shuttle would operate between Fort Clatsop and the RDUA.
- Propose a SETD link from Astoria to Chinook/Ilwaco on approximately 60-minute intervals to improve service to Washington facilities.

The proposed expansion of the Lewis and Clark shuttle system is illustrated in Figure 8.

Charter and school buses would unload visitors at the FOCL visitor center then travel to the proposed RDUA parking area until the visitors are scheduled to leave FOCL.

If there were not enough parking to accommodate buses that are scheduled to arrive at FOCL, then the Astoria Airport would be used for temporary bus parking. The proposed bus parking would be on existing paved parking areas, located in the immediate vicinity of Astoria Airport hangars, administrative offices and the airport terminal.

The dispersed parking system would have a critical reliance on the ticketing and reservation system and the education of visitors before they get to the region. While the reservation system is common to all action alternatives, it is critical to Alternative 4. The primary concept of this system would be to "capture" as many visitors to the region at outlying parking facilities, hotels, and campgrounds and shuttle them to FOCL and other Lewis and Clark resources in the region. The SETD would take the lead in the education of visitors through marketing plans and visitor information. SETD, FOCL, and Oregon Department of Transportation (ODOT) would develop ITS to inform visitors about parking, shuttle, and the reservation information. FOCL will have the lead on maintaining the ticketing system with a potential remote ticketing facility at the intermodal center. The Lewis and Clark Bicentennial Association, of which SETD is a

Figure 8
Fort Clatsop Shuttle Service (Additional Shuttle Service)

component member, is currently preparing a Strategic Plan (*Lewis and Clark Bicentennial in Oregon, 2002*) for accommodating the anticipated increase in visitors to the region during the bicentennial. This plan includes an ITS that would educate visitors driving on roads leading to the region on where to park and buy tickets for their visit to FOCL. A marketing plan would be implemented that would educate the potential visitors nationwide about the bicentennial and access to FOCL, through a complete media kit that would be distributed through a variety of media outlets, web pages, tourism brochures, and contact with tourist/travel agencies. Locally, the ITS would include establishment of information/orientation signs that would provide a constant message about FOCL and the region and electronic signs that can be revised to reflect changes in traffic conditions and parking requirements.

Estimated costs to construct Alternative 4—RDUA/Dispersed Parking range from approximately $1,104,000 to $1,850,000. Alternative 4 would be the lowest cost action alternative.

3.1.5 Mitigation Measures

3.1.5.1 Geology, Soils, and Topography

Short-term impacts on soils by all action alternatives would be mitigated by incorporating low-impact development approaches (vegetative buffers, swales, bioretention bases, etc) to intercept storm water runoff and minimize erosion. The use of pervious pavement materials would also be used to the maximum extent to allow absorption of precipitation by soil, reduce surface runoff, and minimize impacts on groundwater recharge.

3.1.5.2 Water Quality

The use of NPS Best Management Practices (BMPs) would minimize short-term and long-term adverse impacts to water quality by all action alternatives. On-site detention and water quality requirements would be addressed in accordance with the governing jurisdictional requirements. Storm water run-off from the RDUA would be collected on-site, detained, and released at the required historic flows back into the river. The detention areas would also provide for water quality improvements. To satisfy detention and water quality issues, existing wetlands and proposed detention basins or vegetated swales may both be considered in the design solutions. Depending on the final design solution, multiple detention and water quality areas may be utilized to satisfy the jurisdictional requirements and to bring additional enhancements to the site. Furthermore, vegetation buffers would be incorporated at both the RDUA and all action alternative park-and-ride sites as additional protection for adjacent surface waters. As mentioned previously, the use of pervious pavement in and around parking areas would be employed to reduce storm water runoff containing chemicals hazardous to aquatic life.

3.1.5.3 Ecological Resources

Disturbed areas by all action alternatives would be reseeded and revegetated with native species to limit the spread on non-native invasive plants. Replacement trees, shrubs, and herbaceous plants would be selected based on their value to wildlife, non-invasive habitat, and value to the landscape. Potential impacts to fisheries would be minimized by incorporating storm water management plans and water quality improvements that reduce siltation and sediment-loading that can be hazardous to spawning areas and nurseries.

3.1.5.4 Floodplains and Wetlands

Wetland areas adjacent to all action alternatives would be enhanced by the planting of native wetland species, as well as improved storm water control as described in water quality mitigation measures. The design of the proposed action alternatives would avoid direct impacts to wetlands at the RDUA and all park-and-ride sites.

3.1.5.5 Solid Wastes

The solid waste stream would be adversely effected by increased visitation to the region. Recycling of some solid wastes could be encouraged at the RDUA and park-and-ride locations in all action alternatives. Multiple receptacles to accommodate a variety of solid wastes that could be recycled would be available for visitor use. The 1995 GMP calls for FOCL staff to continue efforts of participating in regional programs. FOCL staff could participate in further development of regional recycling programs.

3.1.5.6 Lightscape

The night skies above FOCL have slowly deteriorated over the past decades due to regional growth. Large-scale development is getting closer to FOCL, which would contribute to further degradation of night skies. Development of the RDUA would include lighting for visitor safety. The lighting fixtures utilized at the RDUA in all action alternatives would minimize night sky pollution. FOCL staff could coordinate with city and county agencies to encourage them to develop street and parking lot lighting guidelines to reduce night sky pollution.

3.1.6 Alternatives Considered but Dismissed from Consideration

3.1.6.1 East County Site

Early in the scoping process, a site located on the east side of the North Coast Business Park (east county site) was considered. The proposed site was considered because of its location along the south side of Alternate U.S. 101, approximately one mile west of FOCL. Also, another site adjacent to the east county site was considered. It was determined early in the NEPA process that the potential development timeframe for these sites would extend into the bicentennial years. Since timing of development is a critical need for the proposed project and visitor safety was a major concern, these sites were dismissed from further consideration.

3.1.6.2 River Day Use Area/Private Site

An alternative considering development of the River Day Use Area and a private site for the Park-and-Ride facility was dismissed from further consideration during evaluation of the site and measuring site constraints against the purpose and need of this proposed project. The private site is located approximately one mile from FOCL boundaries and could best be described as an ongoing commercial/industrial activity. Industrial buildings and an open storage area comprise the western portion of the parcel. The balance of the proposed parcel is open space/pasture. As stated in the Purpose and Need section, timing for completion of the proposed project is critical to decision-making. A proposed development site would have to have minimal potential delays to construction to ensure that the facility is operational by 2004. During the initial phases of evaluation, several environmental constraints were identified at the Private Site

that would likely create major delays in the redevelopment of the area for a Park-and-Ride facility. The environmental constraints are:

- The entire site is located in a 100-year floodplain.
- The site is a potential wetland.
- A portion of the site is apparently used for outdoor storage of abandoned vehicles.

Because of potential major environmental impacts and the likely delay to the completion of the proposed Park-and-Ride facility, this alternative was dismissed from any further consideration in this EA.

3.1.7 Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "…the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101." Using the six criteria from Section 101 detailed below, it was determined that Alternative 4—RDUA/Dispersed Parking provides the greatest level of protection of resources of the alternatives evaluated in this EA. The rationale for this determination is provided for each criterion in the following discussion.

Criterion 1—Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

Alternative 4 with its emphasis on utilizing existing SETD transit system resources coupled with planned environmental enhancements at the RDUA such as improvements/restoration of estuarine wetlands and control of existing noxious/invasive vegetation best fulfills Criterion 1. The cooperation between NPS and SETD associated with Alternative 4 supports long-term viability of public transit in the area and educates the public to the value of public transit. The benefits of this emphasis on use of existing transit facilities places this alternative above Alternatives 2 and 3 that involve additional long-term site disturbance at various remote parking locations. Such disturbances at these remote sites would continue to impact the surrounding environment long after the Bicentennial when these sites may no longer be needed to support Ft. Clatsop visitation levels. Alternative 4 also is preferable to Alternative 1 (No-Action) regarding Criterion 1 since the lack of preparation for increased Bicentennial visitation inherent in Alternative 1 would likely result in some damage to resources within the park from uncontrolled vehicle parking and visitors trampling through unauthorized and/or environmentally sensitive areas. Additionally, Alternative 1 would not enhance wetlands adjacent to the RDUA or generally improve environmental conditions at the highly disturbed RDUA. In sum, Alternative 4 is the most sustainable alternative in terms of minimizing further, long-term environmental disturbance at remote parking sites, encouraging regional transit use, and enhancing/restoring wetlands and other ecological resources disturbed by years of industrial use of the RDUA. Visitors would be provided the opportunity to view estuarine wetlands and learn about their important ecological role.

Criterion 2—Assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

Alternative 4 best fulfills Criterion 2 through short-term and long-term control of visitor vehicular and pedestrian traffic within the park (thus improving safety), eliminating the need to build additional off-site parking facilities, reducing the need to use privately owned vehicles to gain access to the park and reducing the intrusion of vehicle traffic noise and air pollution within the immediate vicinity of interpretive areas. Alternative 1 (No-Action Alternative) would result in the continuation, and probable intensification, of traffic and pedestrian congestion within the existing visitor parking area, which would result in greater potential for traffic accidents involving both vehicles and pedestrians. Additionally, air quality and the soundscape within the interpretive area would continue to be adversely impacted with Alternative 1. Alternative 4 also is preferable to Alternatives 2 and 3 regarding Criterion 2 since Alternative 4 minimizes long-term commitments to handle peak Bicentennial parking. Unlike Alternatives 2 and 3, Alternative 4 provides more long-term flexibility in terms of visitor parking by not relying on new off-site, remote parking facilities, which do not take advantage of the capacity of existing SETD facilities. New off-site lots would involve expenditure of funds that could be more productively used for other purposes and also provide no contribution to regional aesthetics.

Criterion 3—Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.

Alternative 4 best meets Criterion 3 by restricting proposed actions to the RDUA and by developing this highly disturbed site in a way to maximize its short-term and long-term efficient use for parking while also preserving, enhancing, and restoring adjacent ecological communities. Although the off-site parking areas discussed as part of Alternatives 2 and 3 are also on highly disturbed sites, by not further developing or disturbing these sites as part of the proposed action, Alternative 4 allows maximum flexibility to use these off-site properties for future beneficial uses – including economically more beneficial uses. Alternative 1, while not disturbing off-site areas, would allow the continued degradation of the RDUA as a result of no additional storm water control, wetland enhancement/restoration, or noxious plant control.

Criterion 4—Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.

All of the action alternatives support the preservation aspects of Criterion 4. However, Alternative 4 best supports diversity and individual choice by coupling existing off-site SETD facilities with access to park facilities. The existing downtown Astoria SETD facilities are associated with a proposed regional multi-modal transportation center. Although this SETD facility remains to be developed as a multi-modal connection site, its existing location downtown, provides easier more direct park access to a wider diversity of people at a variety of economic levels than would remote parking sites proposed as part of Alternatives 2 and 3. As discussed earlier, Alternative 1 falls short of meeting Criterion 4 in terms of preserving cultural and natural resources as well as failing to provide park access to people from a maximum diversity of socioeconomic backgrounds.

Criterion 5—Achieve a balance between population and resource use that will permit high standards of living and wide sharing of life's amenities.

Of all alternatives, including Alternative 1 (No-Action), Alternative 4 achieves the best balance between population (long-term intensity of visitation/visitor use) and resource use/protection again by combining existing SETD transportation resources with enhancement of park cultural and natural resources to maximize, yet control, visitor access. Alternative 4 also provides for maximum equitability of park access by visitors of all socioeconomic backgrounds through its close association with existing transit facilities and possible future multimodal access.

Criterion 6—Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Alternative 4 is preferable to Alternative 3 (West County site) in terms of preserving potentially renewable forestland within the region. Alternatives 1 and 2 are relatively equivalent to Alternative 4 with respect to Criterion 6.

3.1.8 Impact Comparison Matrix

Table 1 is a summary impact comparison matrix for all alternatives considered in this EA.

Table 1
Summary Comparison of Alternatives and Effects

Impact Topic	Alternative 1 (No-Action)	Alternative 2 (RDUA/ Airport Site)	Alternative 3 (RDUA/West County Site)	Alternative 4 (RDUA/ Dispersed Parking)
Geology, Soils, and Topography	Minor, short-term, adverse impacts on soils; Moderate long-term, adverse impacts on soils; Negligible impacts on geology and topography.	Minor, short-term adverse impacts on soils; long-term, minor, adverse impacts on the ecological function of soils in paved areas; Negligible impact on geology and topography.	Moderate short-term adverse impacts on soils; Minor, long-term adverse impacts on soils; Minor, long-term, adverse impact on topography; Negligible impact on geology.	Moderate, short-term, adverse impacts on soils; long-term, minor, adverse impacts on the ecological functioning of soils in paved areas; Negligible impact on geology and topography.
Water Quality	Minor, short- and long-term, adverse impacts on surface waters.	Minor, short- and long-term, adverse impacts on surface waters.	Minor, short- and long-term, adverse impacts on water quality.	Minor, short-term, adverse impacts on water quality;
Ecological Resources	Minor, short- and long-term adverse impacts on flora and fauna; Negligible impacts on Endangered and Threatened species.	Long-term, moderate, beneficial impacts on flora and fauna; may effect, not likely to adversely effect Endangered and Threatened species.	Long-term, moderate, beneficial impacts on flora and fauna; may effect, not likely to adversely effect Endangered and Threatened species.	Long-term, moderate, beneficial impacts on flora and fauna; may effect, not likely to adversely effect Endangered and Threatened species.
Floodplains and Wetlands	Negligible	Negligible impact on floodplains; Moderate, long-term, benefit to wetland enhancement.	Negligible impact on floodplains; Moderate, long-term, benefit to wetland enhancement.	Negligible impact on floodplains; Moderate, long-term, benefit to RDUA wetlands.
Coastal Zone Management	Negligible	Negligible	Negligible	Negligible
Prime and Unique Farmlands	Negligible	Minor, long-term, adverse impacts on farmlands of statewide importance; Negligible impact on prime farmland.	Minor, long-term, adverse impacts on farmlands of statewide importance; Negligible impact on prime farmland.	Minor, long-term, adverse impacts on farmlands of statewide importance; Negligible impact on prime farmland.
Solid and Hazardous Wastes	Negligible	Minor, short-term adverse impacts during construction.	Minor, short- and long-term adverse impacts during construction.	Minor, short- and long-term adverse impacts during construction.
Visitor Experience	Moderate, short- and long-term, adverse impacts.	Minor, long-term, beneficial impacts.	Minor, short- and long-term, beneficial impacts.	Moderate, short- and long-term, beneficial impacts.
Soundscape	Moderate, short- and long-term adverse impacts.	Moderate, short- and long-term, beneficial impacts.	Moderate, short- and long-term, beneficial impacts.	Moderate, short- and long-term, beneficial impacts.
Lightscape	Moderate, short- and long-term adverse impacts.	Minor, short- and long-term adverse impacts.	Minor, short- and long-term adverse impacts.	Minor, short- and long-term adverse impacts.
Socioeconomics	Minor, short-term, beneficial impacts due to increased tourist dollars; Minor, long-term, adverse impacts on job creation.	Minor, short- and long-term beneficial impacts on increased tourist dollars and job creation.	Minor, short- and long-term beneficial impacts on increased tourist dollars and job creation.	Moderate short- and long-term beneficial impacts on increased tourist dollars and job creation.

Impact Topic	Alternative 1 (No-Action)	Alternative 2 (RDUA/ Airport Site)	Alternative 3 (RDUA/West County Site)	Alternative 4 (RDUA/ Dispersed Parking)
Transportation	Moderate, long-term adverse impacts due to increased congestion and lack of mass transit opportunities.	Negligible, short-term impacts; Moderate, long-term, beneficial impacts on reducing congestion and providing mass transit opportunities.	Minor, short-term adverse impacts. Moderate, long-term, beneficial impacts on reducing congestion and providing mass transit opportunities.	Moderate, short- and long-term, beneficial impacts on reducing congestion and providing mass transit opportunities.
Land Use	Minor, long-term, adverse impacts at FOCL; Negligible impact on the surrounding region.	Moderate, long-term, beneficial impacts on FOCL.	Moderate, long-term, beneficial impacts.	Moderate, long-term, beneficial impacts on FOCL and the surrounding region.
Visual and Scenic Resources	Minor, long-term, adverse impacts.	Minor, long-term beneficial impacts.	Minor, long-term beneficial impacts.	Moderate, long-term beneficial impacts.
Infrastructure	Negligible, long-term, adverse impact.	Minor, long-term, beneficial impacts to FOCL; Negligible impacts to the surrounding region.	Minor, long-term, beneficial impacts to FOCL; Negligible impacts to the surrounding region.	Minor, long-term, beneficial impacts to FOCL; Negligible impacts to the surrounding region.
Air Quality	Minor, short- and long-term, adverse impacts at FOCL during peak periods; Negligible impacts to the surrounding region.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.	Minor, short-term, adverse impacts on localized air quality; Long-term, minor, beneficial impacts on regional air quality.
Cultural Resources	Negligible	Negligible	Negligible	Negligible

4.0 AFFECTED ENVIRONMENT

Topics addressed in this section and subsequently analyzed in Section 5.0 (Environmental Consequences) were selected based on their relevance as indicated by on-site visits, secondary source documents, regulatory agency input, and information from NPS personnel.

4.1 Geology, Soils, and Topography

The project vicinity is within the Astoria Basin, which includes Clatsop County and northernmost Tillamook County. The airport site and private site occur on level terrain, while the west county site slopes from north to south across the site. The RDUA is relatively level, except along the Lewis and Clark River where relief drops 8 to 10 feet.

The geology of the RDUA is characterized by three subsurface strata: Quaternary alluvium of Holocene age occurs within the eastern half of the site and consists of unconsolidated floodplain deposits of clay, silt, sand, and basalt gravel. The southwest edge of the site overlies the Smuggler Cove formation of late Eocene age that primarily consists of tuffaceous claystone and siltstone. The remainder of the site overlies quaternary terraces of Holocene and Pleistocene age that consists of alluvial silt, arkosic and basaltic sand, and basalt gravel (Niem and Niem, 1985). The relative earthquake potential is considered high and equal for each of the project alternative sites (Oregon Department of Geology and Mineral Industries, no date).

The airport site is above quaternary alluvium of Holocene age that consists of unconsolidated floodplain deposits of clay, silt, sand, and basalt gravel. The west county site overlies quaternary terraces of Holocene and Pleistocene age that consists of alluvial silt, arkosic and basaltic sand, and basalt gravel (Niem and Niem, 1985).

The soils within the region are varied according to their relative landscape positions. The RDUA is totally comprised of the Coquille-Clatsop complex (11A) on slopes of 0 to 1 percent. This soil complex is typically composed of 60 percent Coquille silt loam and 30 percent Clatsop silt loam, both of which drain very poorly under natural conditions. These soils occur on floodplains and are influenced by tides and have slow permeability. The seasonal high water table (HWT) is generally 24 inches above to 24 inches below the surface throughout the year, and flooding is frequent. Ponding and flooding are the primary constraints for development (Smith and Shipman, 1988).

The airport site is entirely composed of Coquille-Clatsop complex (12A), protected, on slopes of 0 to 1 percent. This soil type is very similar to 11A with the exception of protection from flooding, which is rare, and a seasonal HWT of 6 inches above to 24 inches below the surface from November to June (Smith and Shipman, 1988).

The west county site is composed of 12A soils across its southern half and Walluski silt loam (71B) on slopes of 0 to 7 percent across its northern half. Walluski soils occur on terraces, are moderately well drained, and have slow permeability. The seasonal HWT is generally 24 to 36 inches below the surface from November to May. Shrinking and swelling as well as low soil strength are the primary constraints for development (Smith and Shipman, 1988). The dispersed parking sites already exist and are located in previously developed areas.

4.2 Prime and Unique Farmlands

According to the Clatsop Soil and Water Conservation District (SWCD), there are no prime farmland soils within the county. However, soils having land capability classes of I, II, III, or IV are considered farmlands of statewide importance. As the Coquille-Clatsop complex, protected (0 to 1 percent slopes), and Walluski silt loam (0 to 7 percent slopes) have land capability classes of IV and II, respectively, these soils are farmlands of statewide importance. Consequently, the proposed Park-and-Ride sites at the west county site and Astoria Airport occur on such designated farmland soils, although the RDUA is not so designated. The dispersed parking areas already exist and are located in previously developed areas.

4.3 Floodplains and Wetlands

A small area at the RDUA occurs partially in the 100-year tidally influenced floodplain of the Lewis and Clark River. Although the airport site is outside the limits of detailed floodplain study, it appears that it may also occur within the 100-year floodplain (FEMA, 1999). The west county site is not in a 100-year floodplain. The private site is located entirely within a 100-year floodplain (FEMA, 1999).

Executive Order 11988 (Floodplain Management, May 24, 1977), requires all federal actions to avoid the base (e.g. 100-year) floodplain unless there is no practical alternative, and that the development result is no net decrease in flood flow capacity within the floodplain.

According to National Wetlands Inventory mapping, the RDUA is characterized by a narrow band of forested wetlands along the Lewis and Clark River, impounded emergent marsh within the southwest portion of the site, and emergent marsh/scrub-shrub wetlands within the northwestern portion of the site (NPS, 1995).

A wetland delineation conducted by David Evans and Associates, Inc. in May 1999, indicated two wetland areas within the west county site, which occurs within a larger study area for the North Coast Business Park. Wetland 5 is a 1.8-acre emergent marsh/scrub-shrub wetland dominated by red alder, slough sedge (*Carex abrupta*), skunk cabbage, and soft rush (*Juncus effusus*). At the time of the investigation, water depth was 2 to 4 inches. Wetland 5 occurs along U.S. 101 and is just north of the west county site. Wetland 7 is a 0.65-acre scrub-shrub/ emergent marsh wetland dominated by Hooker's willow (*Salix hookeriana*), red alder, slough sedge, soft rush, and Sitka spruce. At the time of the investigation, water depth was 2 to 4 inches. Wetland 7 occurs in the southwest corner of the west county site and borders U.S. 101 as well (DEA, 2000).

The dispersed parking areas already exist and are located in previously developed areas.

The Astoria Airport was constructed decades ago on former tidally influenced wetlands and is part of the Columbia River Estuary. Wetland delineations are ongoing at the airport and a site visit to the proposed airport park-and-ride site on April 12, 2002 by the Director and Wetlands Coordinator of the Columbia River Estuary Study Taskforce (CREST) confirmed that wetlands are present in the vicinity of the proposed park-and-ride site. Soils in the area are in the Coquille Clatsop complex, which includes hydric soils with slopes of 0 to one percent that are located in tidally influenced floodplains. Dominant vegetation at the site includes Douglas' spirea (*Spirea douglasii*), hooker willow (*Salix hookeriana*), and red alder (*Alnus rubra*) (Scientific Resources, Inc./CREST, 2002). CREST staff observed that most of the site is an area that has historically been extensively disturbed and wetland soil types and wetland vegetation is not present.

Executive Order 11990, Protection of Wetlands (May 24, 1977), requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Section 404 of the Clean Water Act (administered by the U.S. Army Corps of Engineers (USACE), Portland District) establishes a federal permit program for the discharge of dredged or filled material into the waters of the U.S., which can include wetlands. Under Nationwide Permit (NWP) 39 *Residential Commercial, Institutional Development,* up to 0.5 acre of fill may occur within waters of the U.S. (streams, ponds, and wetlands), and up to 300 linear feet of perennial stream may be impacted. Impacts less than 0.1 acre require no action. Impacts between 0.1 acre and 0.5 acre require a preconstruction notification, a wetland delineation, and a mitigation proposal be sent to the district engineer. Impacts exceeding 0.5 acre of fill/dredge and/or 300 linear feet of stream impact require an individual permit from the USACE, which involves local, state, and other federal agency review, as well as public notification and wetland mitigation. However, NPS Wetlands Policy 77-1, which is the NPS implementing regulation for Executive Order 11990, requires mitigation for any adverse effects to wetlands at a ratio of at least 1:1.

Oregon regulates impacts to wetlands by authority of the following statutes as follows: Fill and Removal Act (ORS 196.800-990), Wetlands Conservation Planning (ORS 196.668-692), Comprehensive Land Use Planning Coordination Act (ORS 197.005-197.640), Mitigation Banking Act of 1987 (ORS 196.600-665), and Oregon's statewide planning goals. The Division of State Lands administers the state's fill and removal permit program, forbidding any person from removing or filling more than 50 cubic yards of material in any waters of the state without a permit (ORS 196.810). {Such permits are usually submitted on a joint application form with the Corps district.} Exceptions are in state scenic waterways and areas designated essential indigenous anadromous salmonid habitat, where a permit is required for all fills and removals, regardless of size. The Lewis and Clark River and the Skipanon River are so designated as essential salmon habitat, though they are not scenic waterways.

Wetland mitigation, which can be accomplished by restoring historic wetlands, creating new wetlands, or enhancing existing wetlands, and can be done through a mitigation bank. Mitigation ratios vary from 1:1 to 3:1, and a five-year monitoring program may be required. Additionally, wetlands are regulated through the local zoning requirements instituted by the statewide land use planning program, administered by the Department of Land Conservation and Development. Statewide planning goals 5 (significant wetlands), 16 (estuary planning), and 17 (coastal shorelands) apply to wetland protection (ORS 197.175). The Clatsop County Land and Water Development and Use Ordinance of 1980 (80-14) is applicable to all developments as well.

All development within designated floodplains must comply with Clatsop County Standards S3.650-S3.660 (Ordinance 80-14).

4.4 Coastal Zone Management

Each of the proposed alternative sites, as well as the RDUA, occurs within the coastal zone, defined by the OCMP. The OCMP is an approved program under the federal Coastal Zone Management Act (CZMA). It is managed under the state Department of Land Conservation and Development (DLCD) and draws from four areas to fulfill the state OCMP. These four areas are:

- Agreement with Oregon's statewide planning goals, particularly Goals 17, Coastal Shorelands [OAR 660-015-0010(2)], Goal 18: Beaches and Dunes [OAR 660-015-0010(3)], and Goal 19: Ocean Resources [OAR 660-015-0010(4)].

- Compliance with state-approved local comprehensive land use programs for "coastal" cities and counties.

- Various state statutes including, but not limited to, the Oregon Beach Bill [HB 1601 (1967)] and the Oregon Removal-Fill Act (ORS 196.800-990).

- Consistency with the County's Comprehensive Plan and Zoning Ordinance.

Oregon Law regarding Federal Consistency (OAR 660-035-0000) under the CZMA states that all lands owned, leased, held in trust, or whose use is otherwise by law subject solely to the discretion of the federal government are excluded from the definition of the coastal zone. However, this exclusion still requires that actions on such lands be consistent with the OCMP if such actions directly affect the Oregon Coastal Zone. Since the proposed alternative sites and the RDUA do affect the Oregon Coastal Zone, FOCL must notify the local government and the DLCD of its actions.

The RDUA, Park-and Ride Sites, and dispersed parking areas fall within the Columbia River Estuary, planning area and must be consistent with the OCMP regulations concerning the estuary. Projects, such as development of the RDUA and it's corresponding sites, are reviewed for land use compliance and their impact on the local Coastal Management Program (CMP) by comparing the proposed project to the local land use program. Any proposed action that involves a federal action is reviewed by the DLCD. If development of a site that is not owned by the federal government, but occurs where a federal agency is a partner, a statement of consistency must be filed with the DLCD.

4.5 Water Quality

Water quality surveys were conducted for FOCL along the Lewis and Clark River in August 1996. Fecal coliform bacteria did not exceed the numeric limit for this water quality indicator, and dominant species of diatoms were periphytic species typical of relatively clean and well-oxygenated fresh water with strong currents. Increases in turbidity and suspended solids were expected to be pronounced during highest rainfall in winter. River sediment analysis indicated that mean concentrations of several metals (arsenic, beryllium, nickel, and zinc) exceed typical levels in soils, perhaps due to anthropogenic sources. Although no sediment, semi-volatile organic compounds, pesticides, or polychlorinated biphenyls (PCBs) were detected, toxicity equivalency concentrations suggest a source of dioxin/furans upriver from FOCL (FOCL, 2001).

4.6 Ecological Resources

4.6.1 Vegetation

An extensive list of flora has been prepared for FOCL. As of July 2000, the list contains 10 species of lichens, 51 species of mosses, 21 species of liverworts, 10 species of ferns and allies, 10 species of gymnosperms, 50 species of monocots, and 182 species of dicots, for a total of 334 species. Additionally, 26 species of fungi have been identified (FOCL, 2001).

Preliminary vegetation surveys in April of 2001 and 2002 found 100 vascular plant species at the River Day Use site (Fort Clatsop National Memorial, RDUA Site list). Tree species include Sitka spruce (*Picea sitchensis*), western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), red alder (*Alnus rubra*) and willow (*Salix* spp.). Seventy-three herbaceous species include Lyngby's sedge (Carex lyngbyei), slough sedge (Carex obnupta), reed canarygrass (Phalaris arundinacea), sword fern (*Polystichum munitum*), and birdsfoot trefoil (*Lotus corniculatus*). The site also contains three Oregon Department of Agriculture classified noxious weeds: Scotch broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), and English ivy (*Hedera helix*).

Soil types influenced native vegetation as described in Smith and Shipman (1988). As the airport site is entirely composed of Coquille-Clatsop complex, their original vegetation was likely very similar. Typical species included red alder (*Alnus rubra*), willows (*Salix* spp.), salmonberry (*Rubus spectabilis*), common cattail (*Typha latifolia*), skunk cabbage (*Lysichiton americanus*), horsetail (*Equisetum* spp.), rushes (*Juncus* spp.), sedges (*Carex* spp.), and grasses (*Poaceae*). A July 2001 vegetation survey of the airport site found 42 vascular plant species, half of which are exotic weeds, including Himalayan blackberry (*Rubus discolor*), Scotch broom (*Cytisus scoparius*) and reed canarygrass (*Phalaris arundinacea*) (NPS, 2001). The full listing of plants is in Appendix A.

Astoria High School (AHS) compiled a preliminary plant list at the airport mitigation bank site (ca. one mile east of the project site) in May 2001 and found approximately 45 species. Woody species included Sitka spruce (*Picea sitchensis*), red alder, blackberries (*Rubus* spp.), red elderberry (*Sambucus racemosa*), Nootka rose (*Rosa nutkana*), and willows. Herbaceous plants included creeping buttercup (*Ranunculus repens*), skunk cabbage, common cattail, duckweed (*Lemna minor*), lady fern (*Athyrium filix-femina*), velvet grass (*Holcus lanatus*), spike rush (*Eleocharis* sp.), and scotch broom (*Cytisus scoparius*).

Original vegetation within the northern half of the west county site (on Walluski soils), included sitka spruce, western hemlock (*Tsuga heterophylla*), red huckleberry (*Vaccinium parviflorum*), red alder, salmonberry, salal (*Gaultheria shallon*), and western swordfern (*Polystichum munitum*) (Smith and Shipman, 1988). Currently, the dominant plant across the upland portion of the site is scotch broom—an aggressive and invasive species (DEA, 2000). An April 2002 preliminary vegetation survey of the west county site found 35 vascular plant species (NPS, 2002). A full list of plants is in Appendix A. The dominant tree cover is red alder (*Alnus rubra*), with a mixture of regenerating Sitka spruce (*Picea sitchensis*) and western hemlock (*Tsuga heterophylla*). Other woody species include Scotch broom (*Cytisus scoparius*), salal (*Gaultheria shallon*), evergreen and red huckleberries (*Vaccinium parvifolium* and *V. ovatum*), salmonberry (*Rubus spectabilis*) and Himalayan blackberry (*Rubus discolor*). Herbaceous plants include sword fern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*) and slough sedge (*Carex obnupta*). Dominant wetland species within the small wetland (Wetland 7) on site are described below in Section 4.3. The dispersed parking areas already exist and are located in previously developed areas.

4.6.2 Wildlife

An extensive list of fauna has been prepared for FOCL (FOCL, 2001). Approximately 31 species of fish, 9 species of amphibians, 3 species of reptiles, 44 species of mammals, and 109 species of birds are listed for FOCL. In 2001, FOCL mammal surveys documented 23 species, including bobcat (*Felix rufa*), coyote (*Canis latrans*), Roosevelt elk (*Cervus elaphus*), Columbian black-tailed deer (*Odocoileus hemionus*), river otter (*Lutra canadensis*), mountain beaver (*Aplodontia rufa*) and spotted skunk (*Spilogale gracilis*). Fish surveys of park streams in February 2002 found juvenile coho salmon (*Oncorhynchus kisutch*), juvenile cutthroat trout (*Oncorhynchus clarki clarki*), lamprey (*Lampetra* sp.), shiner perch (*Notropis* sp.), 3-spine stickleback (*Gastereosteus aculeatus*) and sculpin (*Cottus* spp.). Amphibian surveys in May 2002 documented 9 species, including Columbia torrent salamander (*Rhyacotriton kezeri*), northern red-legged frog (*Rana aurora aurora*), giant salamander (*Dicamptodon* sp.), Dunn's and western redback salamanders (*Plethodon dunni* and *P. vehiculum*).

In May 2001 a small mammal survey at the River Day Use Area documented six species in the site's riparian habitat: creeping vole (*Microtus oregoni*), shrew-mole (*Neurotrichus gibbsii*), Pacific jumping mouse (*Zapus trinotatus*), deer mouse (*Peromyscus maniculatus*), Trowbridge's and vagrant shrews (*Sorex trowbridgii* and *S. vagrans*). Other wildlife found at the site during vegetation surveys include northern red-legged frog (*Rana aurora aurora*), Oregon junco (*Junco oreganus*), double-crested cormorant (*Phalacrocorax auritus*), killdeer (*Charadrius vociferus*), American crow (*Corvus brachyrhynchos*) and American robin (*Turdus migratorius*).

A preliminary fauna list at the airport mitigation bank site was prepared by the AHS in May 2001. It included 6 species of fish, 7 species of amphibians, and 50 species of birds. Examples of fish found include threespine stickleback (*Gasterosteus aculeatus*), banded killifish (*Fundulus diaphanus*), and prickly sculpin (*Cottus asper*). The amphibians were represented by species such bullfrog (*Rana catesbeiana*), western toad (*Bufo boreas*), and northwestern salamander (*Ambystoma gracile*). Common species of birds included mallard (*Anas platyrhynchos*), cinnamon teal (*Anas cyanoptera*), rufous hummingbird (*Selasphorus rufus*), barn swallow (*Hirundo rustica*), marsh wren (*Cistothorus palustris*), and common yellowthroat (*Geothlypis trichas*).

At the west county site extensive evidence of frequent elk use was noted in April 2002, including heavy use of trails, recent scat and tree bark stripping. The dispersed parking sites are entirely disturbed. These sites provide minimal or no habitat for wildlife.

4.6.3 Threatened and Endangered Species

Early coordination was conducted with the U.S. Fish and Wildlife Service (USFWS) in Portland, Oregon regarding federally threatened and endangered species that may be affected by the proposed project. In a letter dated July 16, 2001, the USFWS {as per Section 7(c) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)} provided a list of 30 species that may occur within the project area (Table 2). An updated species list was forwarded to FOCL by the USFWS on June 12, 2002.

No state or federal threatened or endangered species of flora and fauna are known to occur within FOCL. However, bald eagles occasionally pass through the memorial area. An active bald eagle nest is located about 0.5 mile southeast of the park. Several fauna that are federal species of concern are known within FOCL. The white-footed vole, fringed myotis, long-legged

Table 2
Federally Listed and Proposed Endangered and Threatened Species, Candidate Species, and Species of Concern That May Occur Within the Area of the Lewis and Clark Bicentennial Alternative Transportation Project Species List USFWS, June 12, 2002

	Common Name	Scientific Name	Status/Habitat
Listed Species			
Mammals	Columbian white-tailed deer	*Odocoileus virginianus leucurus*	E/—
Birds	Marbled murrelet	*Brachyramphus marmoratus*	T/CH
	Bald eagle	*Haliaeetus leucocephalus*	T/—
Fish	Chum salmon[1]	*Oncorhynchus keta*	T/—
	Chinook salmon[1]	*Oncorhynchus tshawytscha*	T—
Invertebrates	Oregon silverspot butterfly	*Speyeria zerene hippolyta*	T/CH
Plants	Howellia	*Howellia aquatilis*	T—
Proposed Species			
Fish	Coastal cutthroat trout	*Oncorhynchus clarki clarki*	PT/—
Candidate Species			
Fish	Coho salmon[1]	*Oncorhynchus kisutch*	CF/—
Species of Concern			
Mammals	White-footed vole	*Arborimus albipes*	
	Red tree vole	*Arborimus longicaudus*	
	Pacific big-eared bat	*Plecotus townsendii townsendii*	
	Silver-haired bat	*Lasionycteris noctivagans*	
	Long-eared myotis	*Myotis evotis*	
	Fringed myotis	*Myotis thysanodes*	
	Long-legged myotis	*Myotis volans*	
	Yuma myotis	*Myotis yumanensis*	
Birds	Band-tailed pigeon	*Columba fasciata*	
	Olive-sided flycatcher	*Contopus cooperi*	
	Streaked horned lark	*Eremophila alpestris strigata*	
	Mountain quail	*Oreortyx pictus*	
	Purple martin	*Progne subis*	
Amphibians and Reptiles	Tailed Frog	*Ascaphus truei*	
	Northern red-legged frog	*Rana aurora aurora*	
Fish	Green sturgeon	*Acipenser medirostris*	
	River lamprey	*Lampetra ayresi*	
	Pacific lamprey	*Lampetra tridentata*	
Plants	Frigid shootingstar	*Dodecatheon austrofrigidum*	
	Queen-of-the-forest	*Filipendula occidentalis*	
	Moss	*Limbella fryei*	

Key: E—Endangered.
T—Threatened.
PT—Potentially threatened.
CF—Candidate for listing as endangered or threatened.
CH—Critical habitat has been designated for the species.
Species of Concern—Taxa whose conservation status is of concern, but for which further information is needed.

[1]Consultation with the National Marine Fisheries Service may be required.

myotis, and Pacific (Townsend's) big-eared bat were all documented within FOCL in 1940. Townsend's big-eared bat was reconfirmed within FOCL in May 2002, and long-eared myotis was documented during a May 2001 small mammal survey. And recently, the northern red-legged frog was documented within FOCL. Lastly, the tailed frog was confirmed adjacent to FOCL's boundary (NPS, 1995).

A biological assessment for rare species was completed by FOCL in July 2002 and is included in Appendix A. Determinations were made for each of the seven federally listed species: Columbian white-tailed deer, marbled murrelet, bald eagle, chum salmon, chinook salmon, Oregon silverspot butterfly, and howellia (a plant).

The Columbian white-tailed deer is federally listed as endangered. USFWS surveys have documented the species as far west as Karlson Island in the Lewis and Clark Islands National Wildlife Refuge, approximately 10 miles east of Astoria. The marbled murrelet is federally listed as threatened. This bird has been noted in the vicinity of FOCL, which contains suitable mature Sitka spruce-western hemlock maritime forest nest habitat, but not within the park. The bald eagle is federally listed as threatened. As mentioned above, eagles are regularly observed along the Lewis and Clark River within and near FOCL, while an active nest site is located 0.5 mile from FOCL and the RDUA. Each of the action alternative Park-and-Ride facilities includes bald eagle flight habitat, though only the RDUA contains feeding and perching habitat. The chum salmon is federally listed as threatened. This species has been found downriver and north of the project area in Youngs Bay (1990) and in the Youngs River near Wireless Road (2002). The action alternative Park-and-Ride facilities do not contain anadromous fish habitat, but the RDUA and proposed riverside trail within the park are directly adjacent to such habitat. Chinook salmon is federally listed as threatened. The Oregon Department of Fish and Wildlife (ODFW) recorded the presence of chinook salmon in the Lewis and Clark River between 1948 and 1996, but none since then. One chinook smolt was seined April 11, 2002 from RM 1 of Hansen Creek (north of the park) by students of Astoria High School.

The action alternative Park-and-Ride facilities do not contain anadromous fish habitat, but the RDUA and proposed riverside trail within the park are directly adjacent to such habitat. The Oregon silverspot butterfly is federally listed as threatened. The population of this species on Clatsop Plains has declined in recent years, with only a single adult documented in 1998 near Camp Rilea. The west county site is approximately 1.0 mile east of the northernmost extent of the butterfly's range on Clatsop Plains, though no suitable coastal grassland habitat exists there. The other Park-and-Ride sites and the RDUA do not contain suitable habitat for the species. Lastly, howellia is federally listed as threatened. This aquatic plant occurs in lakes and ponds in Clakamas, Marion, and Multnomah Counties in Oregon's Willamette Valley, but has not been documented in Clatsop County. None of the Park-and-Ride facilities, dispersed parking, or the RDUA contain palustrine habitat suitable for the species.

Database searches and site surveys were conducted (see Appendix A). As the Airport site is almost wholly disturbed, there is little possibility that it harbors state or federal threatened and endangered species. The west county site is partially disturbed, and may have habitat for some state- or federal-listed species. The dispersal parking sites are totally paved/disturbed and therefore habitat for state or federal threatened and endangered species is not present. The RDUA has perhaps the best habitat diversity for state- and federal-listed species. The dispersed parking sites are entirely disturbed. These sites provide no habitat for state of federal threatened and endangered species.

4.7 Visitor Use and Experience

Generally, visitation trends for FOCL have been on the rise over the past decades. In 1980, FOCL visitation was estimated at 100,060; by 1990, the estimated visitation was 262,728. Current estimates for FOCL is approximately 250,000 persons. Peak season is July and August. In the past few years, visitation has grown in the shoulder seasons (June and September). During the Lewis and Clark Bicentennial (2003-2006), visitation is anticipated to reach as high as 500,000.

Visitor studies conducted in the late 1980s concluded that a large percentage of visitors to FOCL were from outside Oregon, and most visitors from the Pacific Northwest were from the Portland, Oregon, metropolitan area. Off-season visitors are primarily local and regional. School children are a large percentage of visitors during the school year. At the time of this study, visitors spent an average of 1.7 hours at FOCL during the summer months and approximately 45 minutes during the winter. Group tours are bringing larger numbers of visitors to FOCL; however, they tend to have slightly shorter visits than persons arriving in automobiles.

The carrying capacity of FOCL is affected by several factors including the number of existing parking spaces, although during peak weekends visitors park along the entrance road. Other factors include seating capacity of the auditorium, theater, and picnic area. The fort, canoe landing, and visitor center also affect carrying capacity, not so much by size, but by the perception people might have of excessive crowds in these areas.

Based on an assumed 10-hour per day interpretive schedule (8 a.m. to 6 p.m.), the park appears to be capable of handling up to 2,400 visitors per day with interpretation of the Lewis and Clark winter encampment provided by volunteers and staff to all visitors to the park. This range represents the potential carrying capacity of the park, as follows:

- Lower bound (30 visitors/group, 30-minute fort experience)—600 visitors/day
- Upper bound (60 visitors/group, 15-minute fort experience)—2,400 visitors/day
- Typical high day (50 visitors/group, 20-minute fort experience)—1,500 visitors/day

The typical high day of 1,500 visitors per day represents an increase of about 50 to 90 percent over existing visitation levels (800 to 1,000 visitors per day), encompassing the 80 percent increase in visitation.

4.8 Soundscape

One of the important elements of the Lewis and Clark expedition's winter encampment at FOCL was the almost complete absence of human caused noise. Currently, noise could intrude on visitor experience at FOCL primarily due to the proximity of the visitor center parking lot, which is approximately 100 feet from the historic fort. Noise at the visitor center parking lot is typical of any parking lot, including opening and shutting of car doors and vehicle ignition. Tour buses left idling create a constant noise level during the 30-45 minutes for a typical tour stop. Small aircraft—generally private planes—departing and landing at Astoria Airport introduce human produced noise sporadically throughout the day. Other intermittent human caused noise includes highflying commercial aircraft, and nearby logging operations.

4.9 Lightscape

Another important element of the winter encampment was the absence of human caused light at FOCL. FOCL closes the entrance gate at 5 p.m. limiting visitors to daytime experiences of the fort and surrounding forest. However, during winter months it can begin to get quite dark at the fort around 5 p.m., which provides visitors some idea of the nighttime experience of the Lewis and Clark expedition. Occasionally, interpretive staff at FOCL will conduct an evening program that does allow visitors to experience the darkness of a deep forest. The proximity of the visitor center parking lot to the fort results in the occasional period when vehicle lights introduce human caused light in the historic zone of FOCL. There are no lights in the parking lot and the visitor center has limited outside lighting. The night skies experienced by the Lewis and Clark expedition are being affected by ambient light generated by development in the region including recently constructed big-box retail stores along U.S. 101.

4.10 Socioeconomics

4.10.1 Socioeconomic Environment

Clatsop County, Oregon, has a population of about 35,600 people. The county population has grown slowly over the past three decades, and this trend is projected to continue. County population is projected to increase to 38,376 in 2010 and 40,018 by 2015 (Portland State University/Oregon Office of Economic Development). The per capita personal yearly income for the County in 1999 was $23,800, compared to Oregon's at $26,958 and the United States at $28,546. In 1990, the largest employments by industry were retail, consisting of 22.6 percent of all jobs and then manufacturing-durable goods at 9.2 percent. The unemployment rate has gone down considerably from 7.0 percent in 1990 to 4.6 percent in 2000, lower than Oregon's rate of 4.9 percent in 2000 (U.S. Department of Labor, Bureau of Labor Statistics, 2002).

The City of Astoria is located six miles east and slightly north of FOCL and has a population of around 9,800 people. The population significantly increases from tourists, especially during peak season times. The City of Warrenton, with a population around 4,100 people, is five miles from FOCL. The City of Seaside has a population of 5,900 people and is 16 miles south of FOCL. In the year 2000, there were 19,685 total housing units in Clatsop County—4,982 were vacant (25.3 percent vacancy rate). Oregon's vacancy rate is 8.2 percent and the U.S. rate is 9.0 percent. The vacancy rate is high in Clatsop County because 3,092 of the vacant housing units, or 15.7 percent of all housing units, are used for seasonal, recreational, or occasional use due to the area's large tourism draw.

4.10.2 Economic Resources

Located 100 miles west of Portland, Oregon, and 185 miles southwest of Seattle, Washington, this area is easily accessible for day and weekend trips. Peak travel season for the Fort Clatsop area is from June through August and the shoulder seasons are April to May and September to October. Total travel spending has increased over the years by an average annual percentage change of 5.9 percent from 1991 to 2000. In 2000, the total travel spending for Clatsop County was $285.2 million (including air transportation). Clatsop County had the highest number of travel-generated jobs per capita in the state for 1999, with 141 jobs per 1,000 residents, or a total of 4,890 jobs. In 2000, the number of travel-generated jobs increased to 5,260. Local taxes from travel spending generated $3.4 million in Clatsop County in 2000, and state tax revenues were $4.0 million (Dean Runyan Associates, 2002).

4.10.3 Events and Attractions

Tourists are drawn to this region for a variety of reasons, many of which are special events. There numerous events are held in Astoria, Warrenton, Seaside, Gearhart, and Cannon Beach. The Cities of Long Beach and Ilwaco in Washington, also have special events throughout the year. Although the total number of special events are too numerous to list in this document, a sampling includes whale watching in January, the Astoria-Warrenton Crab and Seafood Festival, the Puffin Kite Festival at Cannon Beach, Sandcastle Day at Cannon Beach, the Clatsop County Fair, the Astoria Regatta Festival and Sail, and the Seaside Sand Sculpture and Beach Festival.

Numerous permanent attractions in the region include: the antique trolley "Old Number 300"" along the Astoria riverfront, Columbia River Maritime Museum, Heritage Museum, Flavel House Museum, Uppertown Firefighters Museum, the Astoria Column, and the Aquatic Center. The Seaside Aquarium is another more modern local attraction. Two lighthouses in Washington that light the northern entrance to the Columbia River are the North Head Lighthouse and Cape Disappointment Lighthouse. There are several state parks and public beaches that also compete for tourists and local residents' time.

Other attractions in the area that are associated with the Lewis and Clark expedition include Fort Stevens State Park on the Pacific coast, and Youngs River Falls, which was discovered by a Lewis and Clark hunting party in 1806. Fort Canby and Cape Disappointment on the Washington Coast are also historically relevant sites where Lewis and Clark first saw the Pacific Ocean. In Seaside, the Salt Works replica demonstrates how members of the expedition were able to obtain salt from boiling seawater, and Whale Park in Cannon Beach is where a small party from the Lewis and Clark expedition found the skeleton of a beached whale.

4.10.4 Solid and Hazardous Wastes

Fort Clatsop, and the nearby cities of Astoria and Warrenton, are governed under the solid waste and recycling laws of Oregon and Clatsop County. Oregon attempts to extend the useful life of their landfill sites by encouraging waste prevention, recycling, and reuse opportunities (ORS 459.005 to 459.437, 459.705 to 459.790 and 459A.005 to 459A.665). Clatsop County uses two transfer stations to handle their municipal solid waste and recycling. These transfer stations are the Astoria Transfer Station, and the Seaside-Gearhart Recycling and Transfer Station. The Astoria Station opened in 1985 and collected 23, 069 tons of municipal solid waste and recycling in 1998. The Seaside-Gearhart Station opened in 1984 and collected 6, 963 tons of municipal solid waste and recycling in 1998. Other waste collection facilities located in Clatsop County include a composting facility at Laurelwood Farms, and two industrial solid waste facilities. The industrial waste facilities are the Wauana Cogeneration Project and the Wauna Mill Project. Combined, these two facilities collected 78,622.94 tons of industrial waste in 2000.

The RDUA was formerly used for logging operations. An inadvertent release of petroleum products occurred at the RDUA in 1999 when Willamette Industries was conducting log-sorting operations at the site. The release of approximately 150 gallons of fuel was contained. The contaminated soil (143 tons) was excavated and confirmation sampling was conducted. The confirmation sampling resulted in the conclusion that no contaminants resulting from the inadvertent release of fuel were found (Spencer Environmental, Inc., 2000). A Level I Pre-Acquisition Environmental Site Assessment would be required prior to land acquisition.

Astoria Airport was previously occupied by the Astoria Naval Air Station. The installation included office buildings, military barracks, and other support facilities. There may be a need for a Level I Pre-Acquisition Environmental Site Assessment if developed.

There are no known contaminants at the west county site. There may be a need for a Level I Pre-Acquisition Environmental Site Assessment if developed. The dispersed parking lots already exist. There are no known areas of contamination and no land acquisition would occur requiring a site investigation.

4.11 Transportation

4.11.1 Road System

The regional transportation system is limited to two-lane U.S. highways. U.S. 101 (Oregon Coast Highway), which parallels the coast, is the only significant north-south road west of Interstate 5, which is approximately 80 miles to east. Access to this area from the east is primarily along U.S. 26, which is south of FOCL and from U.S. 30, which parallels the Columbia River. U.S. 30 intersects with U.S. 101/U.S. 26 in Astoria. Local roadways in the vicinity of FOCL are Alternate U.S. 101, Marlin Road, Airport Road, and Fort Clatsop Road. In addition to few major roads, regional access is constrained by Young's Bay, the Pacific Ocean, the Columbia River, and the Lewis and Clark River. These natural features force traffic into narrow bottlenecks at the Young's Bay Bridge and the Lewis and Clark Bridge.

Although this is not a heavily populated region, traffic volumes continue to rise, most notably during peak summer weekends when thousands of tourists from throughout the Pacific Northwest travel to this area. Table 3 summaries traffic volumes on key routes.

Table 3
Traffic Volumes in the Year 2000

U.S. 101 South of US 26	8,100 vehicles per day (vpd)
U.S. 101 through Seaside	16,500 vpd
U.S. 101 through Gearhart	12,900 vpd
U.S. 101, Gearhart to Warrenton	11,900 to 12,700 vpd
U.S. 101, Young's Bay Bridge	22,000 vpd
U.S. 101, Astoria Bridge (Columbia River)	6,300 vpd
U.S. 30, Astoria East City Limit	10,600 vpd
Alt. U.S. 101, Vicinity of Airport Road to Lewis and Clark Bridge	3,300 vpd
Alt. U.S. 101, Old Young's Bay Bridge	7,200 vpd
Source: ODOT, 2001.	

Increasing traffic volumes create more chances for accidents and stressful conditions for drivers. Recent cursory evaluations of the regional road system identified that some roads may be reaching their capacity. Young's Bay Bridge/U.S. 101 is one location where the level of service (LOS) may be reaching a level of LOS E (considerable delay), which is not typically acceptable outside heavily urbanized areas (HNTB, 2002). During recent special events, particularly during the docking of the USS Missouri, congestion was so severe that law

enforcement agencies had to intervene. Increases in traffic volumes are tied to increases in tourism as well as continued development along U.S. 101.

U.S. 101 in the Warrenton area does not yet have a corridor plan adopted by the Oregon Department of Transportation (ODOT). U.S. 101 is designated as a national scenic byway. As a national scenic byway, there are not any mandated regulatory constraints, but the corridor is recognized as having outstanding scenic, historic, recreational, cultural, and natural features.

The ODOT conducts ongoing analyses of accident data statewide to develop a ratio of accidents per one million vehicle miles driven. On U.S. 101, from U.S. 105 to the Warrenton southern city limits, this ratio is 0.92 accidents per million vehicle miles traveled for the year 2000. This is lower than the state average for non-freeway highways, which is 1.53 accidents per one million vehicle miles for the year 2000. Both calendar year 2000 accident rates for statewide non-freeway highways and U.S. 101 are the lowest in the past five years.

There are no plans to widen or improve U.S. 101 between the U.S. 26 split north (through Warrenton) other than possible re-alignment of Dolphin Road on the west side of U.S. 101; and the possible intersection of U.S. 101 with the possible extension of Business 101 from the east (ODOT, 2002).

State Highway Alternate/Business 101 in the Warrenton/Fort Clatsop area does not have a corridor plan adopted by Oregon.

On State Highway Alternate/Business 101, from Lewis and Clark Road to the Warrenton southern city limits, the accident ratio is 1.14 accidents per million vehicle miles traveled for the year 2000. This is lower than the state average for non-freeway highways.

While the statewide 2000 rate for non-freeway highways of 1.53 is the lowest ratio in the past five years, the State Highway Business 101 year 2000 rate of 1.14 is the second highest in the past five years. The average accident ratio for Business 101 for the past five years is 0.99.

There are conceptual plans to extend Highway Business 101 to the west to provide a new connection to U.S. 101 through the county-owned land that makes up the North Coast Business Park development.

The extension of State Highway Alternate/Business 101 to create a new connection and intersection with U.S. 101 has been proposed. This proposed project is at the conceptual level of discussion. A particular alignment of this extension has not been recommended; however, an overview of three possible routes has been prepared by ODOT. The most likely alignment goes westerly towards the county owned business park then curves northwesterly as it approaches U.S. 101 and connects Alternate 101 to U.S. 101 on the west side of the business park (ODOT, 2002). There are no other plans to widen or improve Highway Business 101 in the area of Fort Clatsop in the six-year state transportation improvement plan.

4.11.2 Transit

SETD provides general fixed-route transit services for all coastal communities in Clatsop County. Transit service is provided weekdays and on Saturday. In 2000, over 94,000 riders used the transit service. Seventeen percent of the total transit riders were seniors and the disabled. With increasing numbers of visitors to regional tourist attractions, SETD identified the need to increase service to those attractions. A recent study (Astoria/Warrenton Lodging Study)

estimated that visitation will increase between 70 and 100 percent during the peak of the Lewis and Clark Bicentennial. In 2000, SETD prepared the Lewis and Clark Shuttle Feasibility Study. According to this study there may be 1,100 additional vpd on peak weekends during the Lewis and Clark Bicentennial, and tourist attractions will not have the capacity to handle the increase. During this peak period there will be a shortage of approximately 1,500 parking spaces in the region. SETD recommends that a series of new Park-and-Ride s be constructed throughout the region. The size of these proposed Park-and-Ride s will vary throughout the region, but SETD recommends that the large lots be centrally located. These new Park-and-Ride s might be served by a revised shuttle system taking riders to tourist attractions, hotels, and coastal cities. The dispersed parking areas are already constructed and they are within the SETD service area.

4.12 Land Use/Zoning

FOCL is located in a rural portion of Clatsop County that is experiencing growth pressures. The City of Warrenton's growth boundary is less than a mile from FOCL and good regional access on U.S. 101 is attractive to developers and businesses. The U.S. 101 corridor is characterized by a mixture of commercial, office and industrial land uses. This land use pattern changes slightly on Airport Road. A single-family residential area is located between the land use mix along the U.S. 101 corridor and Astoria Airport. The land south of Alternate 101 is primarily rural with scattered homes, pastures, an Oregon state forest, open space, and forests owned by Willamette Industries.

The proposed RDUA is currently a vacant parcel that was formerly used as a log off-loading facility. The surrounding land is rural/forest. A single-family residence is on the southern boundary of the site. This parcel is zoned by Clatsop County as agriculture-forest 20. This zoning designation allows small-scale forest management activities and agricultural uses. The proposed RDUA would be an allowed use at this site.

The proposed Park-and-Ride site at the Astoria Airport is a vacant parcel. Land uses in the vicinity of the airport are a mix of open space, residential, and industrial. The Astoria Airport master plan has designated this parcel as general commercial or industrial. Development of the proposed Park-and-Ride would be permitted at this site.

The proposed bus parking area at the airport is located in the Aviation Support Area, west of the airfield. Facilities in this area include aircraft hangars, terminal/office building, and other airport support operations. Development of the bus parking area would be permitted in this location. The proposed areas where bus parking would occur are not known to be contaminated.

The proposed Park-and-Ride at the west county site is in the City of Warrenton. The land is undeveloped. Although the land surrounding this parcel is primarily rural, Clatsop County is proposing to develop the area for a business/industrial park. Warrenton does not have a comprehensive plan, but is currently preparing a plan that will address future land use in the city. The west county site is zoned General Commercial Type 1.

The dispersed parking areas in Astoria and Seaside are in urban areas within mixtures of commercial/business and residential land uses in the vicinity.

4.13 Visual/Scenic Resources

The FOCL region is characterized by a landscape of forested, hummocky ridges; steep ravines; and low-lying, long, narrow, sandy ridges with intervening streams, lakes, and marshes extending to the Pacific coast. This natural landscape is bisected by U.S. 101. The natural landscape first experienced by the Lewis and Clark expedition is changing to an urbanized landscape, affecting local visual resources and regional viewsheds(NPS, 1995).

The RDUA still exhibits natural landscape elements that were experienced by the Lewis and Clark expedition. The river, floodplain, and surrounding forested hills still provide a natural setting that offers visitors some experience similar to what was experienced 200 years ago. Some development has occurred in the vicinity, including the construction of log raft building pylons in the river and some scattered rural residential structures.

The airport site is predominantly industrial to the north and east. The views in these directions are of typical aviation related development. Views to the south reveal a striking contrast to the airport development. Land to the south is an undeveloped mixture of pasture and woodlands.

The west county site is currently not developed and exhibits a more natural scenic resource. The viewsheds from this site are primarily of open meadows/pasture and forested hills. Views toward the U.S. 101 corridor are limited by topography.

Dispersed parking areas are located throughout the region and have viewsheds that range from urban, commercial lined streets to woodland and ocean views.

4.14 Infrastructure

The RDUA is within the Young's River/Lewis and Clark Water System service area. The RDUA is served with potable water. Existing water lines in the area include a three-inch water line 0.5 mile south of the site on the east side of Fort Clatsop Road. There is adequate capacity available from this water line. There are no sewer lines in the vicinity of this site and no plans for expansion in this area.

The Astoria Airport is within the City of Warrenton Public Works service area for both potable water and sanitary sewer. An eight-inch water line is located along the north side of Airport Road, the northern boundary of the airport site. The city's water system supply is near its capacity. New water taps are only granted for single family homes within certain areas of the city (City of Warrenton, 2002).

A six-inch forced main sanitary sewer line is also located along the north side of Airport Road. The city's sewer system is currently treating 600,000 gallons per day, 200 percent of its capacity. The city is working with Oregon Department of Environmental Quality (ODEQ) to expand the plant's capacity. There is a moratorium on sewer line extensions until capacity is expanded. The city intends to have the plant expansion completed by 2008 (City of Warrenton, 2002).

The west county site is within the City of Warrenton Public Works service area. There are no water lines on U.S. 26/U.S. 101 at the site. However, there are water lines in the vicinity, including an 18-inch water line on the east side of Dolphin Road north of U.S. 101, and an eight-inch water line on the east side of Dolphin Road south of U.S. 101. This area is also

within the City of Warrenton Public Works service area for sewage treatment; however, there are no sewer lines at this site.

Existing dispersed parking areas in urban areas have utilities available in the vicinity.

4.15 Air Quality

The air quality at FOCL has been designated Class II under the Clean Air Act. Air quality monitoring by the Air Quality Division of the Oregon Department of Environmental Quality is not conducted in Clatsop County because past monitoring has documented good air quality (NPS, 1995). Wind from the Pacific Ocean generally pushes air pollutants out of the region. On occasion, there is detectable odor from area pulp mills, however these events are typically short in duration (NPS, 1995). Occasionally, particularly during peak weekends when the visitor center parking lot is at maximum capacity, visitors might be disturbed by emissions from idling tour buses.

4.16 Cultural Resources

4.16.1 Regional Archaeological Overview

The earliest Prehistoric evidence in the Northwest Coast belongs to the Fluted Point and Stemmed Point traditions and dates to 10,000-11,000 before present (BP). Remains are likely associated with the game hunters who spread south following the last Wisconsinan glaciation (Carlson, 1990). Additional remains are associated with the Pebble Tool and the Microblade traditions, dating to 9,000-10,000 BP. Unfortunately, evidence supporting the early occupations (before 5,000 BP) on the Northwest Coast is unclear, as rising sea levels have inundated most of the older archaeological sites. Due to poor bone and wood preservation, the artifact assemblages dating before 5,000 BP are limited to flaked stone tools, which appear quite different from the post-5,000 BP pecked and ground stone tools. The differences between the various early groups gradually disappeared between 5,000-10,000 BP through adaptation, acculturation, and population growth (Carlson, 1990).

Minor (1983) proposes four cultural phases specific to the Columbia Estuary region. The diagnostic elements for Minor's cultural sequence are predominantly projectile points, although items such as net weights, atlatl weights, and shell beads provide additional diagnostic support. The Youngs River Complex, dating from 8,000-6,000 BP, is represented by willow-leaf and shouldered lanceolate points, stemmed scrapers and stone weights. The Seal Island Phase (6,000-2,000 BP) is marked by a predominance of broad-necked projectile points. This phase provides the earliest radiocarbon dated evidence for the mouth of the Columbia River at 3,180 BP. The Ilwaco Phase is divided into two subphases—Ilwaco 1 (2,000-950 BP) and Ilwaco 2 (950-225 BP). Ilwaco 1 is characterized by a dominance of narrow-necked projectile points, girdled net sinkers, pecked tools for food processing, and atlatl weights. By the Ilwaco 2 subphase, broad-necked points are no longer found and harpoon technologies have changed to a composite toggling form. Although the first recorded contact between the native Chinook speaking peoples and Euro-Americans occurred in 1792, Minor begins his Ethnographic Phase at 1775 (225 BP). Chinookans had obtained European goods indirectly by this date, through trade or salvage of wrecked ships along the coast. Historic artifacts are the diagnostic element for this phase, as well as a shift from girdled to perforated and wrap-marked net sinkers. Minor's Ethnographic Phase comes to a close circa 1851, with the dispersal and assimilation of the few Chinookans who survived Euro-American encroachment and disease.

4.16.2 Historic Overview of the Fort Clatsop Area

The Fort Clatsop National Memorial was established in 1958. The history of the fort, and its significance within the context of Captains Lewis and Clark, is well documented in the National Park Service's Fort Clatsop National Memorial Administrative History (Seattle, 1995) and the National Register of Historic Places nomination for Fort Clatsop National Memorial (1986). To avoid redundancy, this information is only briefly summarized below.

The Lewis and Clark expedition of 1804 to 1806 is considered to be one of the single most important events in American expansion and exploration. The thirty-three member "Corps of Discovery" included Captains Meriwether Lewis and William Clark, Sacagewea and her husband Toussaint Charbonneau, and various frontiersmen and fur traders of American and European descent (Cannon, 1995). Commissioned by President Thomas Jefferson to explore the newly acquired Louisiana Purchase and beyond to the Pacific Ocean, Lewis and Clark recorded valuable information about native western people, flora, and fauna. Though untrained, Lewis and Clark meticulously documented the plants and animals they encountered with diligence and detail (Northrop, 1986). The journals of the Lewis and Clark party were particularly detailed in their descriptions of the Indian tribes they encountered. In many cases, Lewis and Clark were the first Euro-Americans with whom western tribes had contact, including the Chinookan Tribe, which was virtually eradicated because of small pox and other diseases by the 1830s. As a result of their journey, Lewis and Clark's journals provide the only detailed account of the Chinookan culture.

The Corps of Discovery is known as the first group to construct a building—Fort Clatsop— in Oregon (Pollard, no date). Fort Clatsop National Memorial is comprised of two sites: the reconstruction of the winter encampment and the Salt Cairn at present-day Seaside, where expedition members extracted and milled salt. Fort Clatsop, the winter encampment, was sited on the west bank of the Netul River (now known as the Lewis and Clark River), "on a rise about 20 feet higher than the high tides and thickly covered with lofty pine." According to Captain Lewis, the winter encampment was "certainly the most eligible situation for winter purpose" (Northrop, 1986).

Constructed in December 1805, Fort Clatsop encompassed approximately 125 acres and included a fifty square foot fort, two cabins, and associated outbuildings. According to archival records, Clark appears to have been the principal camp designer. His journals include sketches, a floor plan, and locations of rooms and firepits. Journals from other party members supplement the information provided by Clark, offering descriptions about floor construction and other details. The Corps of Discovery occupied this site until March 23, 1806, when they embarked on their return voyage (Miller, 1958).

Not long after its occupation by the Corps of Discovery, Fort Clatsop was abandoned. According to oral and written accounts, early Pacific Coast visitors occasionally stopped at the camp during the first decade of the nineteenth century. The first documented visitor following Lewis and Clark was Gabriel Franchere of John Jacob Astor's Pacific Fur Company in 1811. Franchere claimed that he saw evidence of Lewis and Clark's buildings, but only ruins remained, including "piles of rough unhewn logs, overgrown with parasite creepers" (Northrop, 1986). Based on Franchere's description, the condition Fort Clatsop was significantly deteriorated as early as 1811. An 1820 Congressional report verified the existence of foundations and other fort remains at Fort Clatsop (Cannon, 1995).

Subsequent visitors during the first half of the nineteenth century reported that Fort Clatsop was in an advanced stage of disrepair. The area attracted new settlers, who attempted to capitalize on the region's abundant timber, fishing, and game resources. The establishment of a sawmill in the area by Richard Moore in 1852 encouraged further settlement. Early homesteading attempts included S. M. Hennel of Astoria, who in 1849 filed an Oregon Provisional Government land claim on the land encompassing Fort Clatsop. Hennel was not granted the patent; the following year, however, Thomas Scott filed claim under the 1850 Donation Act. Scott transferred the property to Carlos Shane that same year. Shane earned a patent, but only occupied the site until 1852 or 1853. Then, he deeded the land to his brother Franklin, who abandoned the land in 1856. Although unoccupied, the land remained in the family and was cleared of much of its timber. Franklin Shane's daughter, Mary Araminta, married Wade Hampton, who built a house on the property in 1872. The property was abandoned again in 1890, and remained so until the Oregon State Historical Society purchased the three-acre tract of land encompassing the Fort Clatsop site in 1901 (Cannon, 1995; Northrop, 1987).

During the next 50 years, additional land was acquired and numerous attempts were made to locate precisely Fort Clatsop. However, in 1953, The Oregonian reported "deplorable condition[s]" at the site (Cannon, 1995). Fort Clatsop began to gain national recognition because of the sesquicentennial celebration of the Lewis and Clark expedition. The Clatsop County Historical Society oversaw construction of a Fort Clatsop replica in 1954 and 1955. In 1958, the Fort Clatsop National Memorial was established, replicating the winter camp of the Lewis and Clark party based on maps, sketches, and personal accounts. The existing memorial includes replicas of the fort and salt works, a bronze statue, art, and rare book collections. The site also includes artifacts of a nineteenth century home and settlement, but archeologists have discovered no evidence of the fort itself.

The development of Fort Clatsop National Memorial reflects a distinct period of National Park Service operational history. Fort Clatsop was established as a direct result of Mission 66, a ten-year plan enacted in 1956. Mission 66 was intended to improve NPS facilities to accommodate the rapidly increasing number of visitors during the post-World War II era without compromising the integrity and protection of historic and natural resources. During the ten-year period, the program spent more than $1 billion on road and infrastructure improvements, renovation of existing Civilian Conservation Corps (CCC) buildings, and introduced the "visitor center" concept with unprecedented gusto. Indeed, between 1956 and 1966, over 100 new visitor centers were built, including the Fort Clatsop visitor center, which was completed in 1963. In addition to the influx of visitor centers, many national monuments, including Fort Clatsop, were established during this time, reflecting a growing emphasis on visitor accommodation and historical interpretation (French, 2002; Cannon, 1995).

4.16.3 Regional Ethnographic Resources

The Project Area lies within the Northwest Coast culture area, in an area traditionally occupied by the Lower Chinookans. The Lower Chinookans spoke the Chinook language and occupied the territory around the mouth of the Columbia River, from Tillamook Head on the Oregon coast north to Willapa Bay on the Washington coast and east to Young's Bay on the Columbia River (Silverstein, 1990). At the time of Euro-American contact, the Chinook-speaking Clatsop Indians occupied the Project Area. The Clatsop inhabited the south bank of the Columbia River, including Young's Bay, and their territory extended south to Tillamook Head (Ruby and Brown, 1976; Silverstein, 1990).

The Clatsop practiced a subsistence pattern that exploited both riverine and marine resources (Connolly, 1992; Silverstein, 1990). Permanent villages were occupied during the winter while temporary camps were established in the summer for seasonal resource exploitation. Major village sites were recorded at the mouth of the Neawanna and Neacoxiee creeks, and at Seaside (Connolly, 1992). Villages typically included cedar-plank houses that held three to fifteen families. During the summer months, temporary campsites were preferred and consisted of light frames covered with cattail or cedar bark (Ruby and Brown, 1976; Silverstein, 1990).

The Clatsop Indians subsisted on a variety of foods, often following seasonal rounds of harvest activities. The wapato tuber was a staple, harvested at the root and gathered in small canoes. Camas, thistle, fern, horsetail, and cattail roots also were collected and steamed in an earth oven. Other collected flora included berries, cow parsnip, water parsley, and lupine. Huckleberry, salal berry, and bearberry were dried and made into cakes (Silverstein, 1990).

The rivers and coast provided a major source of food, with several species of salmon, steelhead, sturgeon, and herring migrating upstream and back to the ocean. Seals, porpoises, and sea lions were hunted with spears and provided meat and blubber. Clams were collected primarily from Willapa Bay and traded up the Columbia. Fishing techniques varied according to the type of fish and the location, with fish weirs and traps frequently used on smaller streams (Hajda, 1990), while nets, especially the seine, were employed near the Columbia mouth (Silverstein, 1990). Gaff hooks and spears also were used. Specific fishing stations were reoccupied annually, with well-defined territories traditionally controlled by tribal groups. Large quantities of fish were preserved using drying racks placed over fires (Hajda, 1990). Hunting and gathering activities occurred before and after the major salmon migrations and were subject to less territoriality than fishing (Silverstein, 1990). Hunters used bow and arrows, spears, traps, snares, and after 1805, muskets to obtain game animals (Silverstein, 1990).

The earliest documented contact between the Europeans and the Lower Chinookans occurred in 1792 when Robert Gray and John Boit entered the mouth of the Columbia River and spent the winter at Young's Bay. Lewis and Clark extensively documented the settlement and subsistence patterns of the Chinookans between 1805 and 1806. Due in part to the interaction with the Lewis and Clark expedition, the Chinookans became the dominant traders of the region and tried to limit Euro-American interactions with other Native American groups further inland (Ruby and Brown, 1976; Silverstein, 1990). The epidemics of the 1830s and 1840s devastated Indian communities, and by 1900 most of the Clatsop had intermarried with the Tillamook, abandoning the Chinook language (Silverstein, 1990).

5.0 ENVIRONMENTAL CONSEQUENCES

This section of the EA forms the scientific and analytic basis for the comparisons of alternatives as required by 40 CFR 1502.14. This discussion of impacts (effects) is organized in parallel with Section 4.0 (Affected Environment) and is organized by resource areas. The No-Action Alternative and each action alternative are discussed within each resource area. To the extent possible, the direct, indirect, short-term, long-term, beneficial, and adverse impacts of each alternative are described for each resource area.

Impairment Analysis—The *National Park Service Management Policies* (NPS, 2001a) requires analysis of potential effects to determine whether or not actions would impair park resources or values.

The fundamental purpose of NPS, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values; and, the park's enabling legislation, as amended, further mandates resource protection. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable, actions that would adversely affect park resources and values.

These laws give NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. Impairment may result from NPS activities in managing the park, from visitor activities, or from activities undertaken by concessionaires, contractors, and others operating in the park. Impairment of park resources can also occur from activities occurring outside park boundaries. An impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park.
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park.
- Identified as a goal in the park's GMP or other relevant NPS planning documents.

Cumulative Impacts—The CEQ regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for both the no-action and proposed action alternatives.

Cumulative impacts were determined by combining the impacts of the proposed alternative with potential other past, present, and reasonably foreseeable future actions. Therefore, it was

necessary to identify other ongoing or foreseeable future projects within FOCL and, if necessary, the surrounding region. Reasonably foreseeable cumulative actions include:

- The immediate area of FOCL has been extensively logged in the past and logging operations continue in the region. The area along the Lewis and Clark River proposed for the RDUA has been extensively disturbed for a log off-loading and construction of "log rafts" that transported logs down river.

- The 1995 FOCL GMP/EIS calls for the expansion of FOCL boundaries from 125 acres to 1,088 acres. This action would be taken to provide viewshed protection, allow establishment of the Lewis and Clark National Historic Trail from FOCL to the Pacific Ocean, and protect FOCL resources. The proposed 5 1/2-mile trail would include trailheads with limited parking for automobiles, RVs and bikes.

- The 1995 GMP/EIS called for staffing at FOCL to be increased to meet the anticipated needs from higher visitation and the proposed boundary expansion. Primary roles for new NPS staff would be interpretation and resource management.

- Proposed natural resource management actions at FOCL include restoration of wetlands and native species and eradication of invasive species.

- Future development at Astoria Airport is projected to include commercial and industrial activities. Airport officials are lobbying to regain commercial aviation service.

- The North Coast Business Park between U.S. 101 and U.S. Business Route 101 is 270-acres is size, however the only construction to date has been the North Coast Youth Correctional Facility and the Clatsop County animal shelter. The business park is located northwest of FOCL. Any potential near term development has been delayed until Clatsop County and the U.S. Army Corps of Engineers resolve wetland issues related to construction of the internal loop road.

- The SETD is proposing the expansion of the regional transit service to accommodate anticipated increases in tourism. The increase in the number of buses in the transit system would require construction of an addition to the storage/maintenance facility.

- Tourism is becoming a larger segment of the regional economy of northwest Oregon. In addition to several sites associated with the Lewis and Clark expedition, numerous other events and recreational activities are drawing more visitors to the region each year. The increase in tourism results in a corresponding increase in the number of vehicles on regional roads.

- There are no plans for major road improvements along U.S. 101, however there is a proposal being considered by ODOT for realignment of Business 101. The realignment could result in a new intersection with U.S. 101 on the west side of the North Coast Business Park.

Intensity, Duration, and Type of Impact—Evaluation of alternatives takes into account whether the impacts would be negligible, minor, moderate, or major (minor being barely detectable, moderate being clearly detectable, and major being a substantial alteration of historic conditions). Duration of impacts are evaluated based on the short-term or long-term nature of alternative-associated changes on existing conditions. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative. More exact interpretations of

intensity, duration, and type of impact are given for each resource area examined. Professional judgement is used to reach reasonable conclusions as to the intensity and duration of potential impacts.

5.1 Impacts on Geology, Soils, and Topography

5.1.1 Methodology

Impact analysis focuses on the effects of alternatives on slope erosion and soil characteristics. The analysis is primarily qualitative since parameters such as storing and handling fill material, re-establishing vegetation on exposed areas, and implementing erosion control measures are yet to be finalized, pending final design. Best professional judgement is used to produce conclusions on the intensity and duration of potential impacts.

Basis of Analysis—

Soil Characteristics—Impacts of the alternatives on soils based on their erosion, strength and subsurface characteristics are discussed.

Intensity, Duration, and Type of Impact:

- **Negligible**—No change in drainage capacity or moisture absorbency of existing soils, no erosion potential during or after construction, and no potential changes to groundwater quality or flow.
- **Minor**—Very limited soil disturbance (under five acres) having some possible short-term and localized effects related to increased erosion potential but no long-term changes in soil drainage capacity, moisture absorbency, or groundwater resources.
- **Moderate**—Disturbance of five acres or more of soil requiring an erosion control plan with mitigation, measurable long-term changes in soil drainage and moisture absorbency characteristics, and possible small-scale indirect impacts on groundwater resources
- **Major**—Disturbance of five acres or more of soil requiring an erosion control plan with mitigation, measurable long-term changes in soil drainage and moisture absorbency characteristics, direct or indirect impacts on local groundwater flow and/or quality, and permanent impacts on the ecological functioning of soils in terms of moisture absorption, nutrient recycling, and support of plant growth.
- **Duration:**
    - **Short-Term**—Lasting only during the construction period or no longer than two years
    - **Long-Term**—Essentially a permanent post-construction impact

5.1.2 Alternative 1—No-Action Alternative

Analysis—There would be no construction in this alternative, so there would be no construction impacts to soils. However, on peak weekends at FOCL, there are usually a number of vehicles parked along FOCL roads. This type of unauthorized parking would be expected to increase during the bicentennial and would contribute to compaction of soils and destruction of soil-stabilizing vegetation along roadway shoulder areas thus contributing to some increase in soil erosion adjacent to roadways. Additionally, foot traffic adjacent to the roadways would further contribute to soil compaction and destruction of vegetation.

Cumulative Impacts—Though Alternative 1 may result in moderate long-term adverse impacts to soil erosion by off-road parking, future possible expansion of FOCL from 125 acres to 1,088 acres for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there would also be cumulative moderate long-term adverse impacts to soils. This alternative would have negligible adverse cumulative impacts on the geology and topography.

Conclusion—Alternative 1 would have a short-term and long-term minor adverse impact on soils adjacent to existing FOCL roadways in the short-term. However long-term adverse impacts in terms of compaction and erosion could be moderate if overflow parking continued along the sides of FOCL roads.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.1.3 Alternative 2—River Day Use Area/Airport Site

Analysis—Alternative 2 could result in clearing and grubbing of up to 13 acres and grading of 10,500 cubic yards (cy) at the Park-and-Ride facility and clearing and grubbing of approximately 11 acres and grading of 8,200 cy at the River Day Use Area (RDUA). These soil-disturbing activities would increase the potential for moderate short-term soil erosion at both the airport Park-and-Ride site and at the RDUA. Soil compaction and any increases in impervious surface areas at these sites would also contribute to less groundwater recharge and faster runoff with a higher possibility of long-term localized soil erosion problems at discharge points. Additionally, soils under paved areas would cease to function in their ecological role. The seasonal HWT and low bearing strength of original soils on both sites are moderate constraints for development. However, as both sites have a history of disturbance (from logging operations at RDUA and from former military barracks at Airport site), soil characteristics from fill material are unknown. Potential long-term minor adverse impacts on soils would be mitigated by incorporating low-impact development approaches (vegetative buffers, swales, bioretention bases, etc) to intercept storm water runoff. The use of pervious pavement materials would also be used to allow absorption of precipitation by soil, reduce surface runoff, and minimize impacts on groundwater recharge. Clearing and grubbing would have a negligible long-term adverse impact upon bedrock and topography at the airport site and RDUA.

Cumulative Impacts—Additional soil disturbance and paving at the airport site would cumulatively contribute to any existing soil erosion associated with existing paved surface runoff. Much of the area has been highly disturbed in the past, and minor long-term cumulative adverse impacts to soils can be expected with future developments at Astoria Airport adjacent to the Park-and-Ride facility. Past logging operations at the RDUA resulted in large areas of highly disturbed soils and replacement with fill material. Future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus additional minor long-term adverse impacts to soils. Alternative 2 in addition to other past and foreseeable actions would have a minor cumulative adverse impact on soils, particularly at the RDUA. This alternative would have negligible adverse cumulative impacts on the geology and topography of either site.

Conclusion—Alternative 2 would have a short-term minor adverse impact on soil erosion at construction sites both at the RDUA and at the airport. This alternative would also have a long-term minor adverse impact on the ecological functioning of soils in paved areas. The use of fill material soil with better strength-bearing capacity than native soils may be necessary. This alternative would have a negligible long-term adverse impact on geology and topography.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.1.4 Alternative 3—River Day Use Area/West County Site

Analysis—Alternative 3 could result in clearing and grubbing of up to 12 acres and grading of 19,500 cy at the Park-and-Ride facility and clearing and grubbing of 11 acres and grading of 8,200 cy at the RDUA. Impacts of this Alternative on soil erosion and ecological functioning would be similar to that described for Alternative 2 although the potential long-term adverse impacts would be somewhat greater given the larger area of graded surface at the West County site. The shrink-swell capacity, seasonal HWT, and low strength of soils on both sites are constraints for development. The West County Park-and-Ride facility has greater relief (and required grading) than the Park-and-Ride facility associated with the other two action alternatives, and consequently, the potential for soil erosion would be slightly higher. The use of fill material soil with better strength-bearing capacity than native soils may be necessary. Disturbance to bedrock is not expected by this alternative. Erosion potential from this alternative can be minimized by incorporating BMPs such as silt fencing and straw bales during construction. Potential long-term major adverse impacts on soils would be mitigated by incorporating low-impact development approaches (vegetative buffers, swales, bioretention basins, etc) to intercept storm water runoff. The use of pervious pavement materials would also be used the maximum extent to allow absorption of precipitation by soil, reduce surface runoff, and minimize impacts on groundwater recharge. Clearing and grubbing would have a negligible long-term adverse impact upon bedrock and topography at the RDUA, while at the West County site the long-term adverse impact to topography would be minor and the long-term adverse impact to bedrock would be negligible.

Cumulative Impacts—Cumulative impacts on soils at the RDUA would be similar to those described for Alternative 2. Any future site development associated with the planned North Coast Business Park and realignment of Business 101 would cumulatively contribute to minor long-term adverse impacts to soil erosion associated storm water discharge points and to further loss of soil ecological functioning. This alternative in addition to other past and foreseeable actions would have negligible cumulative adverse impacts on the geology of either site, though there would be minor adverse cumulative impacts to topography at the West County site.

Conclusion—Alternative 3 would have a short-term moderate adverse impact and long-term minor adverse impact on soil erosion. This alternative would have a long-term minor adverse impact on natural topography at the West County Park-and-Ride facility. Long-term adverse effects on geology would be negligible.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.1.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—Alternative 4 would have similar impacts as Alternative 2 on soils and soil functioning within the RDUA. Alternative 4 would not impact soils at the existing SETD Park-and-Ride locations since this alternative would not result in ground disturbance at any of these sites. There would be no impacts to geology, or topography at the SETD sites since no construction activity is planned at these sites. Soil impact mitigative actions for Alternative 4 at the RDUA would be identical to those described for Alternatives 2 and 3.

Cumulative Impacts—Cumulative impacts on soils and soil functioning within the RDUA for Alternative 4 would be similar to that described for Alternatives 2 and 3. Long-term adverse cumulative impacts on soils in addition to other foreseeable actions at the SETD sites are negligible as these sites are already developed (i.e. paved). Long-term adverse cumulative impacts on topography and geology by Alternative 4 in addition to other foreseeable actions would be negligible at the SETD sites as they are fully developed sites, while long-term cumulative adverse impacts at the RDUA would be negligible due to its history of past disturbance from logging operations.

Conclusion—Alternative 4 would have a short-term moderate adverse impact on soil erosion and a long-term minor adverse impact on ecological functioning of soils in the permanently paved areas of the RDUA. Long-term adverse impacts from this alternative on geology and topography at the RDUA and the SETD sites would be negligible.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.2 Impacts on Water Quality

5.2.1 Methodology

Impact analysis focuses on the effects of alternatives on erosion and siltation into adjacent surface waters and changes in the quantity and quality of storm water runoff after construction. The analysis is primarily qualitative since parameters such as storing and handling fill material, re-establishing vegetation on exposed areas, implementing erosion control measures, and the types and locations of storm water control facilities are yet to be finalized. Best professional judgement is used to produce conclusions on the intensity and duration of potential impacts.

Basis of Analysis—

Site Slope and Soil Characteristics—Impacts of the alternatives on surface waters is based on the degree of slope across each site and soil types, and is discussed in general terms, because the exact extent of cut and fill is not currently known.

Post-construction Storm Water Management—The increases in impervious surface areas associated with all action alternatives would increase the quantity and decrease the quality of any storm water runoff exiting the sites.

Intensity, Duration, and Type of Impacts:

- **Negligible**—Neither surface water quality nor hydrology would be changed from current conditions
- **Minor**—Changes in surface water quality or hydrology would be measurable, although the changes would likely be small and the effects would be localized. No mitigation measures would be necessary.
- **Moderate**—Changes in surface water quality and/or hydrology would be measurable and long-term but would be relatively local. Mitigation measures would be necessary and would be effective.
- **Major**—Changes in surface water quality and/or hydrology would be measurable and noticeable. Mitigation measures would be necessary and their success would not be guaranteed.

- **Duration:**

  - **Short-Term**—Recovery in less than a year.
  - **Long-Term**—Essentially a permanent post-construction impact

5.2.2 Alternative 1—No-Action Alternative

Analysis—Alternative 1 would not require clearing, grading, or paving of the Park-and-Ride facility or of the RDUA. There would be no erosion and siltation impacts into adjacent surface waters, such as the Lewis and Clark River, Skipanon River, or their tributaries. This alternative would not change existing storm water runoff characteristics at any of the sites.

Cumulative Impacts—Alternative 1 could result in minor long-term adverse impacts to water quality by off-road parking, while other actions such as expansion of FOCL boundaries and a fort to ocean trail could require trailheads with limited parking, resulting in cumulative minor long-term adverse impacts to water quality.

Conclusion—Alternative 1 would have a minor short- and long-term adverse impact on local and regional surface waters.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.2.3 Alternative 2—River Day Use Area/Airport Site

Analysis—Alternative 2 could result in clearing and grading of the relatively level Park-and-Ride facility at Astoria Airport and RDUA that is also relatively level with some minor exceptions. This alternative could also require paving up to 154,800 square feet at the Astoria Airport and approximately 80,970 square feet at the RDUA. The increase in impervious surface would result in a moderate increase of surface water runoff. Storm water runoff at the Astoria Airport would flow into the existing storm water system. Storm water runoff at the RDUA would be directed to a storm water detention system that incorporates existing/created wetlands. The storm water would be collected on-site, detained, and released at the required historic flows back into the river. The program for the RDUA is the same in each action alternative; however, the amount of impervious surface in this alternative is less than Alternative 3 but much more than Alternative 4. The use of BMPs would minimize such short-term and long-term minor adverse impacts, especially to the Lewis and Clark River that immediately borders the River Day Use Area. This alternative would have a long-term minor adverse impact on surface waters as a result of increased quantities of storm water runoff from paved areas and minor contamination of this runoff with oils, greases, heavy metals, etc., which can adversely affect aquatic life. Installation of permanent storm water control devices and integration of a wetland detention system would help mitigate these long-term minor adverse impacts.

Cumulative Impacts—There are likely to be long-term minor, adverse impacts to water quality to the Lewis and Clark River. There are no foreseeable actions in the immediate vicinity of the RDUA that would add to the storm water runoff from this site and create impacts greater than those stated above. The Port of Astoria is planning more development for the Astoria Airport that would create an increase in storm water runoff. Storm water runoff from this proposed alternative would likely be a high percentage of the new construction at the airport. But storm water runoff from this site would likely be a small percentage of the total runoff from the

airport. These actions plus the Alternative 2 action at the airport site would result in cumulative long-term impacts that are minor and adverse to water quality.

Conclusion—Alternative 2 would result in short-term minor adverse impacts to water quality within adjacent surface waters during construction and long-term minor adverse impacts to water quality after construction.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.2.4 Alternative 3—River Day Use Area/West County Site

Analysis—Alternative 3 would require clearing and grading of the West County Site and RDUA, both of which have varied elevations. This alternative could result in paving of up to 206,250 square feet the West County site and approximately 80,970 square feet the RDUA. Because the program is generally the same for the RDUA for all alternatives, the amount of impervious surface is the same as Alternative 2. There would be a larger paved area for the proposed Park-and-Ride facility in this alternative than Alternative 2. The potential for siltation at the Park-and-Ride facility may be slightly greater than for the Park-and-Ride facilities associated with the other two action alternatives because of the site's topography. Nevertheless, the use of BMPs would minimize such impacts, especially to the Lewis and Clark River, which immediately borders the RDUA. As with Alternatives 2 and 4, this alternative would have a permanent minor adverse impact on surface waters as a result of increased quantities of storm water runoff from paved areas and minor contamination of this runoff with oils, greases, heavy metals, etc., which can adversely affect aquatic life. Installation of permanent storm water control devices and the use of existing/created wetlands would help mitigate these long-term minor adverse impacts. This alternative would result in the greatest amount of impervious surface construction of all the alternatives.

Cumulative Impacts—Cumulative impacts for this alternative would be the same as Alternative 2 for the RDUA. Other foreseeable actions include proposed development of the North Coast Business Park. There are few facilities in the business park so storm water runoff from the West County site would initially be a high percentage of the runoff, but with continued build-out of the business park, the Park-and-Ride facility would ultimately contribute a small amount of storm water runoff. With use of BMPs, which could incorporate nearby wetlands for detention, this alternative would result in long-term, minor adverse impacts to the tributaries of the Skipanon River and the Lewis and Clark River. The West County site, in combination with foreseeable actions of the adjacent Business Park, would result in cumulative minor long-term adverse impacts to water quality.

Conclusion—Alternative 3 would result in short-term minor adverse impacts to water quality within adjacent surface waters during construction and long-term minor adverse impacts to water quality after construction.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.2.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—Alternative 4 would require minimal clearing and grading of a level area at the RDUA. This alternative could result in paving of up to 69,000 square feet of the RDUA. The additional parking in this alternative would be some type of pervious surface such as gravel. The dispersed parking facilities already exist in urbanized areas. The Lewis and Clark River bordering the eastern portion of the RDUA for this alternative presents the potential that site disturbance during construction and storm water runoff from constructed paved areas (i.e., contamination with oils, greases, heavy metals, etc.) could have a minor impact on surface waters, which can adversely affect aquatic life. The use of BMPs would minimize such impacts, especially to the Lewis and Clark River that immediately borders the RDUA. Installation of permanent storm water control devices and the use of existing/created wetlands would help mitigate these minor long-term impacts.

Cumulative Impacts—The cumulative impacts from this alternative would be similar to Alternative 2 for the RDUA despite there being more parking for automobiles. There are no known plans or development proposals that would change storm water runoff in the vicinity of these parking lots. Cumulatively, these actions would result in minor short-term adverse impacts, but minor long-term beneficial impacts as less new impervious surface would be required than other action alternatives.

Conclusion—Alternative 4 would result in short-term minor adverse impacts to water quality within adjacent surface waters during construction, and minor long-term beneficial impacts. This alternative would result in the least amount of proposed impervious surface of all action alternatives.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.3 Impacts on Ecological Resources

5.3.1 Methodology

Impact analysis focuses on the vegetation and wildlife resources, including threatened and endangered species, known within or adjacent to Alternative 1 and the Proposed Action Alternatives.

Basis of Analysis—The basis of analysis was the amount of direct terrestrial disturbance and indirect aquatic disturbance for each action alternative. Potential impacts for state and federal threatened or endangered species were also assessed.

Intensity, Duration, and Type of Impact:

- **Negligible**—No native terrestrial plant communities and/or aquatic communities would be disturbed and there would be no direct or indirect impacts on native flora and fauna, including federally listed species.
- **Minor**—Disturbance of regionally typical native terrestrial plant communities and/or aquatic communities would be limited to under one acre for terrestrial communities and to highly localized areas of small tributaries to the Skipanon River and the Lewis and Clark River itself. There would be no impact on federally listed species.

- **Moderate**—Disturbance of regionally typical native terrestrial plant communities and/or aquatic communities would occur. The area of disturbance would be from one to five acres of terrestrial habitat and the length of river tributaries from the point of construction disturbance to the Skipanon River or the Lewis and Clark River. There could be indirect impacts to federally listed species.
- **Major**—Disturbance of more than five acres of regionally typical terrestrial plant community or any acreage of critical habitat for federally listed species. Disturbance of tributaries of the Skipanon River and Lewis and Clark River and a measurable portion of the Lewis and Clark River itself.
- **Duration:**

  - **Short-Term**—Complete disturbance recovery in less than five years
  - **Long-Term**—Disturbance recovery requiring more than five years to return to pre-disturbance levels.

5.3.2 Alternative 1—No-Action Alternative

Analysis—Alternative 1 would not require the clearing and long-term loss of vegetation, or disposal of woody waste, within the Park-and-Ride facility or the RDUA. There would not be short- or long-term displacement of fauna due to construction and loss of habitat. However, there would be continued, and likely increased, trampling of roadside vegetation within portions of the park resulting from visitors illegally parking and walking along roadways during peak visitation periods.

Cumulative Impacts—Though Alternative 1 would not directly impact ecological resources, possible off-road parking may cause minor long-term adverse impacts to vegetation. Future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there could be cumulative minor long-term adverse impacts to vegetation and cumulative minor long-term adverse impacts to wildlife and threatened and endangered species.

Conclusion—Alternative 1 would have a minor short-term and long-term adverse impact on roadside flora within the park.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.3.3 Alternative 2—River Day Use Area/Airport Site

Analysis—Alternative 2 would result in the moderate long-term loss of up to 13 acres at Astoria Airport and up to 11 acres at the RDUA of herbaceous and woody vegetation, as well as habitat for common species of wildlife. NPS personnel have conducted a survey for rare, threatened, and endangered species at the RDUA and Airport site. No listed species or their habitats were located. There are no known threatened or endangered species inhabiting the airport site, which is highly disturbed from past land uses. A biological assessment prepared by FOCL natural resources staff (2002) determined no effect upon the Columbian white-tailed deer, marbled murrelet, Oregon silverspot butterfly, and howellia plant by all action alternatives. A determination of **may effect, not likely to adversely effect** was made for the bald eagle, chum salmon, and chinook salmon for all action alternatives (see Appendix A).

Although land at the airport and RDUA would be disturbed, these areas would be reseeded and revegetated with native species. Revegetation of portions of each site would have a long-term, moderate, beneficial impact to the area because each site is currently degraded with fill materials and low quality vegetation due to past logging and/or disturbance.

Cumulative Impacts—Past logging operations at the RDUA resulted in large areas of highly disturbed habitats. Future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus result in additional cumulative minor long-term adverse impacts to flora and fauna. Past development at the airport site has heavily disturbed native flora and fauna in the area. As a result, much of the existing flora remaining in the vicinity of the proposed airport Park-and-Ride facility consist of exotic weedy species. While Alternative 2 would continue the past pattern of vegetation disturbance at the RDUA and airport sites, disturbed areas would be reseeded and revegetated with native species.

Conclusion—Alternative 2 would result in a long-term moderate, beneficial impact on existing flora and fauna at both the Park-and-Ride facility and the RDUA. This alternative may effect, not likely to adversely effect rare, threatened, or endangered species and their habitats.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.3.4 Alternative 3—River Day Use Area/West County Site

Analysis—Alternative 3 would result in the moderate permanent loss of up to 12 acres at the West County Site and up to 11 acres at the RDUA of herbaceous and woody vegetation, as well as habitat for common species of wildlife. NPS personnel have conducted a survey for rare, threatened, and endangered species at the RDUA and West County site. No listed species or their habitats were located. There are no known threatened or endangered species inhabiting either the West County site or the RDUA, which are highly disturbed from past land uses. A biological assessment prepared by FOCL natural resources staff (2002) determined **no effect** upon the Columbian white-tailed deer, marbled murrelet, Oregon silverspot butterfly, and howellia plant by all action alternatives. A determination of **may effect, not likely to adversely effect** was made for the bald eagle, chum salmon, and chinook salmon for all action alternatives (see Appendix A). Native plant species would be used to revegetate disturbed areas. Potential long-term minor adverse impacts to flora and fauna within and adjacent to the RDUA site would be identical to that described for Alternative 2.

Cumulative Impacts—Past disturbance of the West County site included extensive clearcutting for lumber. Alternative 3 would further disturb a portion of the site slowly regenerating back to native forest with red alder being the existing dominant tree species along with some Sitka spruce and western hemlock. Alternative 3 in addition to other foreseeable actions would cumulatively contribute to a minor long-term decrease in native plant (albeit pioneer and early successional species) abundance within the region. Cumulative impacts within the vicinity of the RDUA would be identical to those described for Alternative 2, in that future possible expansion of FOCL for the fort to ocean trail and vicinity would result in additional cumulative minor long-term adverse impacts to flora and fauna.

Conclusion—Alternative 3 would result in a long-term moderate, beneficial impact on existing flora and fauna at both the West County Park-and-Ride facility and the RDUA. This alternative may effect, not likely to adversely effect rare, threatened, or endangered species resulting from construction and operation at the West County site and the RDUA.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.3.5 Alternative 4—RDUA and Dispersed Parking

Analysis—Alternative 4 would result in ecological disturbance within the RDUA identical to that for the other two action alternatives. There would be no impacts to vegetation and wildlife resources at the SETD sites since no construction activity is planned at these sites. NPS personnel have conducted a survey for rare, threatened, and endangered species at the RDUA and dispersed parking sites. No listed species or their habitats were located. Consequently, no threatened or endangered species or their habitats are known to occur at either the RDUA or the SETD sites. A biological assessment prepared by FOCL natural resources staff (2002) determined no effect upon the Columbian white-tailed deer, marbled murrelet, Oregon silverspot butterfly, and howellia plant by all action alternatives. A determination of **may effect, not likely to adversely effect** was made for the bald eagle, chum salmon, and chinook salmon for all action alternatives (see Appendix A).

Cumulative Impacts—Past activities at the RDUA site and dispersal parking sites have heavily disturbed native flora and fauna in those areas. As a result, much of the existing flora remaining in the vicinity of the RDUA area consists of exotic weedy species, while essentially no vegetation remains at the SETD sites. While Alternative 4 would continue the past pattern of vegetation disturbance at the RDUA site, disturbed areas would be reseeded and revegetated with native species. There would be no cumulative long-term adverse impact to vegetation and wildlife resources or threatened or endangered species at the SETD sites as they are completely developed. Cumulative impacts within the vicinity of the RDUA would be identical to those described for Alternative 2, in that future possible expansion of FOCL for the fort to ocean trail and vicinity would result in additional cumulative minor long-term adverse impacts to flora and fauna

Conclusion—Alternative 4 would have a long-term moderate, beneficial impact on terrestrial flora and fauna at the RDUA site but no impact at the dispersed parking sites. Overall, Alternative 4 would have less impact to flora and fauna than Alternatives 2 and 3. This alternative may effect, not likely to adversely effect threatened and endangered species or their habitats resulting from construction and operations of the RDUA and a negligible long-term adverse impact from continued use of dispersed parking.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.4 Impacts to Floodplains and Wetlands

5.4.1 Methodology

Impact analysis focuses on the effects of alternatives on floodplain integrity and impacts upon wetlands. The analysis is primarily qualitative since alternative selection and final design is pending.

Floodplain and Wetland Boundaries—Impacts of the alternatives on floodplains and wetlands are based on the extent of mapped 100-year floodplain and formally delineated wetlands that occur within the Park-and-Ride facilities and the RDUA.

Intensity, Duration, and Type of Impact:

- **Negligible**—Wetlands, "other waters of the U.S.," and 100-year floodplains neither directly impacted by fill nor indirectly impacted by changes in drainage patterns.
- **Minor**—Wetlands fill below Nationwide Permit thresholds (0.1 acre fill or less) and/or indirect impacts from changes in drainage patterns. No more than 200 linear feet of impact to streams and drainages. Minimal change in flood flow capacity within 100-year floodplain.
- **Moderate**—Fill of 0.1—0.5 acre of wetland requiring a Nationwide Permit with mitigation and/or indirect impacts on wetlands of exceptional high quality from changes in drainage patterns. No more than 300 linear feet of impact to streams and drainages. Small change in flood flow capacity within 100-year floodplain.
- **Major**—Fill of any size of wetlands of exceptional quality and/or any other wetlands requiring an individual Section 404 permit with mitigation (greater than 0.5 acre of impact). Greater than 300 linear feet of impact to streams and drainages. Substantial change in flood flow capacity within 100-year floodplain.
- **Duration:**
    - **Short-Term**—Impacts from temporary modifications to surface flows to wetland areas and/or floodplains during construction.
    - **Long-Term**—Essentially a permanent construction/post-construction impacts to wetlands or 100-year floodplains either directly through fill or indirectly through drainage changes.

5.4.2 Alternative 1—No-Action Alternative

Analysis—Alternative 1 would not impact floodplains or wetlands as defined in Executive Orders 11988 and 11990, respectively. There would be no beneficial impacts from wetland restoration.

Cumulative Impacts—Past actions at the RDUA include a long history of site disturbance from logging operations. Alternative 1 would have a negligible long-term adverse impact on floodplains and wetlands. Future possible expansion of FOCL for the trail from the fort to ocean and vicinity would require trailheads with limited parking, and thus there could be cumulative minor long-term adverse impacts to wetlands and floodplains.

Conclusion—Alternative 1 would have a negligible long-term adverse impact on floodplains and wetlands.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.4.3 Alternative 2—River Day Use Area/Airport Site

Analysis—The Alternative 2 Park-and-Ride site at the Astoria Airport may occur within the 100-year floodplain but would not substantially impede or reduce the flood flow or flood capacity of the floodplain. A small portion of the RDUA along the riverbank occurs within the 100-year floodplain. All construction that is not water dependent would be out of the 100-year floodplain. However, all water dependent excepted construction within floodplains would be designed to not impede flood flow or flood capacity, and would require coordination and

permitting from the U.S. Army Corps of Engineers, Portland District. Wetlands were found to occur on the south end of the Park-and-Ride site and in the vicinity of the RDUA. However, wetlands would be avoided at the Park-and-Ride facility, and at the RDUA. Construction of the pedestrian connection (boardwalk) from the RDUA to the historic canoe landing would result in a short-term moderate adverse and a long-term minor adverse impact to the tidal wetlands along the Lewis and Clark River shoreline. However, wetland restoration would be conducted with the aid of native wetland species and improvements to the site hydrology at the RDUA vicinity and, in combination with improved storm water control utilizing BMPs, there would be a long-term moderate beneficial impact on these wetlands. The boardwalk would be constructed to cross approximately 1,800 linear feet of tidal wetland for education and interpretation of wetland habitats. The boardwalk would be constructed on pilings that would be driven into the wetland. Best Management Practices to be utilized by the NPS are described in Appendix B.

The construction of the river overlook, canoe access, water taxi dock, and pedestrian boardwalk at the RDUA would meet the conditions under Section 4.2A of NPS-DO-77-1 Wetland Protection and Special Directive 93-4 as "excepted actions." Excepted actions are defined as certain types of activities that cannot accomplish their intended purposes unless they are located in or are carried out in close proximity to wetlands. The boardwalk meets the requirements as an excepted action that is used for the primary purposes of public education, interpretation, and/or the enjoyment of wetland resources. The proposed canoe access and water taxi dock are excepted actions that fall under "small boat ramps, launches, piers, or docks with total wetland impact (both onsite and offsite) of 0.1 acre or less." The proposed project would incorporate restoration of degraded wetlands, to reestablish natural ecological processes. These water dependent actions are also excepted actions from NPS Floodplain Management Guidelines. Because these proposed actions fall under excepted actions for both floodplains and wetlands, a Statement of Findings (SOF) does not need to be filed.

Cumulative Impacts—Additional development at the airport may result in cumulative long-term minor adverse impacts to wetlands and floodplains. The FOCL GMP (1995) proposes evaluating restoration and protection of wetlands within the Memorial and on lands proposed for inclusion for the three GMP action alternatives. Nevertheless, future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there may be cumulative minor long-term adverse impacts to wetlands and floodplains.

Conclusion—Alternative 2 would have a negligible impact on the functioning of floodplains associated both with the Park-and-Ride facility and the RDUA. Alternative 2 would have a moderate beneficial impact on wetlands.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.4.4 Alternative 3—River Day Use Area/West County Site

Analysis—The Alternative 3 Park-and-Ride facility is not in a floodplain. A narrow portion of the RDUA does occur within a 100-year floodplain, however long-term adverse impacts to floodplains would be negligible as all proposed construction would be designed to not impede flood flow or flood capacity. The two wetlands adjacent to the West County Park-and-Ride facility would not be impacted. Refer to Alternative 2 for a description of the impacts of the RDUA on area wetlands and excepted actions under Section 4.2A of NPS-DO-77-1 and NPS Floodplain Management Guidelines.

Cumulative Impacts—Cumulative long-term adverse impacts to floodplains and wetlands for the development of the RDUA in this alternative would be similar to Alternative 2. Proposed development of the Park-and-Ride facility at the West County site would not adversely impact wetlands. However Clatsop County constructed the primary internal loop road for the North Coast Business Park without coordination with the USACE, Portland District. Further development of the business park that would require connections to the loop road has been stopped by USACE until the issue has been resolved. Should additional development proceed, direct impacts to wetlands and indirect impacts from storm water could result in cumulative minor long-term impacts to wetlands near the West County site. Also, construction of realigned Business 101 could have cumulative minor long-term impacts to wetlands. The FOCL GMP (1995) proposes evaluating restoration and protection of wetlands within the Memorial and on lands proposed for inclusion for the three GMP action alternatives. Nevertheless, future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there may be cumulative minor long-term adverse impacts to wetlands and floodplains.

Conclusion—Alternative 3 would have a negligible impact on 100-year floodplains or wetlands at the West County Park-and-Ride facility. This alternative would have a negligible impact on floodplain functioning at the RDUA. Alternative 3 would have a long-term, moderate, beneficial impact on wetlands adjacent to the RDUA as a result of wetland enhancement.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.4.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The dispersed parking areas already exist, and no new construction would occur to implement this action alternative. Dispersed parking would consequently result in negligible long-term adverse impacts to floodplains and wetlands. With exception of potential for additional gravel parking, the program for the development of the RDUA site is the same as in Alternative 2. Any additional pervious surface would avoid wetlands.

Cumulative Impacts—Cumulative impacts related to Alternative 4 would be similar to Alternative 2. Wetlands and floodplains do not occur at the SETD sites and consequently cumulative long-term adverse impacts would be negligible. The RDUA would have a negligible long-term adverse impact on floodplains, whereas there would be a long-term minor positive impact to wetlands by enhancement of tidal wetlands in the vicinity of the connecting boardwalk. The FOCL GMP (1995) proposes evaluating restoration and protection of wetlands within the Memorial and on lands proposed for inclusion for the three GMP action alternatives. Nevertheless, future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there may be cumulative minor long-term adverse impacts to wetlands and floodplains.

Conclusion—Alternative 4 would have a negligible long-term adverse impact on the functioning of floodplains associated with the dispersed parking sites and the RDUA. Alternative 4 would have a negligible long-term adverse impact on wetlands at the SETD sites and a long-term moderate beneficial impact on wetlands resulting from development of the RDUA.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.5 Coastal Zone Management

5.5.1 Methodology

Impact analysis focuses on the effects of alternatives on Oregon's Coastal Management Program (OCMP) and impacts upon coastal zones in the park and at the sites. The OCMP's objective is to develop, implement, and continuously improve a management program which will preserve, conserve, develop, and restore the natural resources of the coastal zone.

Coastal Zone Management—Impacts of the alternatives on Oregon's coastal zones are based on information from the OCMP regarding the extent of coastal zones that occur within the Park-and-Ride facility and the RDUA.

Intensity, Duration, and Type of Impact:

- **Negligible**—Coastal zones are neither directly impacted by construction or use of the RDUA or Park-and-Ride.
- **Minor**—Coastal zones are slightly impacted by construction and use of the RDUA or Park-and-Ride.
- **Moderate**—Coastal zones are moderately impacted by construction and use of the RDUA or Park-and-Ride.
- **Major**—Coastal zones are severely impacted by construction and use of the RDUA or Park-and-Ride.
- **Duration:**
    - **Short-Term**—Impacts from temporary modifications to surface flows to coastal zones during construction.
    - **Long-Term**—Essentially a permanent construction/post-construction impacts to coastal zones either directly through fill or indirectly through drainage changes.

Basis of Analysis—

Consistency—Impacts of the alternatives are based on consistency with Oregon Coastal Management Program.

5.5.2 Alternative 1—No Action Alternative

Analysis—The No-Action Alternative would not result in new construction and therefore would not impact coastal zone management areas.

Cumulative Impacts—The No-Action Alternative would have a negligible impact on coastal management areas. Future actions resulting from development outside of FOCL, but within Oregon's coastal zone could result increased quantities of storm water runoff, and minor contamination of this runoff with oils, greases, and heavy metals within this alternative. This would result in a long-term, negligible, adverse cumulative impact. The No-Action Alternative would not be a component of the cumulative impacts of other foreseeable actions.

Conclusion—The No-Action Alternative would have a negligible impact on coastal zone management areas.

Impairment—There would be no impairment of FOCL's resources or values from this alternative.

5.5.3 Alternative 2—RDUA/Airport Site

Analysis—Both the airport site and the RDUA occur within the coastal zone described by the OCMP. A statement of consistency would have to be filed with the DLCD for both the RDUA and the airport site. There will be piling constructed at the RDUA for use in the pedestrian connection and the visitor staging area, but the use of piling would be minimal. The use of pilings is allowed because it meets the criteria set forth in current OCMP regulations. These criteria include using pilings to meet a demonstrated public need, does not interfere with public trust rights, there is no feasible alternative, and potential impacts are minimized. (Clatsop County Land and Water Development and Use Ordinance, 2000). During construction of the pedestrian connection and visitor staging area, where pilings would be used, there is no other upland alternative, there is no impairment of public trust rights, and BMP's would be in place to minimize impacts on the estuary. In addition, the pilings and resulting pedestrian connection construction would meet a public need with expansion of FOCL and aid in the interpretation of FOCL's (and the natural area's) history. At the airport site there would be minimal impact on the OCMP. Development and resulting use of the airport site would have BMP's in place to mitigate any potential run-off into the estuary from the site. This alternative would have a long-term, minor, adverse impact on surface waters as a result of increased quantities of storm water runoff, and minor contamination of this runoff with oils, greases, and heavy metals into the coastal zone.

Cumulative Impacts—Construction of the RDUA (including the pedestrian connection and boardwalk) would have a short-term minor impact to the coastal zone. However, the resulting vegetative restoration in the RDUA would have a long-term, minor beneficial impact on the coastal zone by protecting the shore lands associated with the RDUA. There would be a long-term , minor, adverse impact on coastal zones in the area of FOCL due to the development of the RDUA in combination with FOCL's proposed expansion and new trailhead construction. There may be additional runoff at the airport site due to the combination of the Park-and-Ride and future development of the site, but this would have a negligible impact on the coastal zone because the nearby current uses of the site are currently approved under local coastal management plans. There would be a long-term, minor, adverse cumulative impact on coastal zones within this alternative.

Conclusion—This alternative would have a negligible impact on coastal zone areas protected under the CZMA.

Impairment—There would be no impairment of FOCL's resources with this alternative.

5.5.4 Alternative 3—RDUA/West County Site

Analysis—The development of the RDUA and the requirements for complying with the OCMP for this alternative are the same as in Alternative 2. Within the West County Site there would be some runoff due to the clearing and grading necessary for the Park-and-Ride, however, BMP's would be in place to minimize the amount of runoff. There would be a long-term, minor, adverse impact on surface waters at the West County site as a result of increased quantities of storm water runoff, and minor contamination of this runoff with oils, greases, and heavy metals into the coastal zone.

Cumulative Impacts—The cumulative impacts on OCMP for the RDUA are identical to those described in Alternative 2. There may be additional runoff at the West County site due to the combination of the Park-and-Ride and future development of the site, but this would have a negligible impact on the coastal zone because the nearby current uses of the site are currently approved under local coastal management plans. Other reasonably foreseeable future impacts include an increase in tourist traffic and the proposed realignment of Highway 101, which would have a long-term, minor adverse impact. There would be a long-term, minor, adverse cumulative impact associated with this alternative on the coastal zone.

Conclusion—This alternative would have a negligible impact on coastal zone areas protected under the CZMA.

Impairment—There would be no impairment of FOCL's resources with this alternative.

5.5.5 Alternative 4—RDUA/Dispersed Parking

Analysis—This alternative occurs within the coastal zone described by the OCMP. The RDUA requirements for consistency under the OCMP are the same as described under Alternative 2. There is no need to notify local governments or the DLCD for the dispersed parking described in this alternative because existing sites already in compliance with the OCMP are used.

Cumulative Impacts—The cumulative impacts for the RDUA under this alternative would be the same as described in Alternative 1. There may be additional runoff at the dispersed parking sites due to the combination of the Park-and-Ride and any future development at the sites. This would have a negligible impact on the coastal zone because the nearby current uses of the site are currently approved under local coastal management plans. Other reasonably foreseeable future impacts include an increase in tourist traffic and the proposed realignment of Highway 101, which would have a long-term, minor adverse impact. There would be a long-term, minor, adverse cumulative impact associated with this alternative on the coastal zone.

Conclusion—This alternative would have a negligible impact on coastal zone areas protected under the CZMA.

Impairment—There would be no impairment of FOCL's resources with this alternative.

5.6 Impacts to Prime and Unique Farmlands

5.6.1 Methodology

Basis of Analysis—

Designated Prime and Unique Farmlands—Impacts of the alternatives on prime and unique farmlands and farmlands of statewide importance are based on designations provided by the Clatsop County Soil and Water Conservation District. There are no prime farmland soils designated within Clatsop County.

5.6.2 Alternative 1—No-Action Alternative

Analysis—Alternative 1 would not be associated with any land use changes or conversion of agricultural lands to non-agricultural uses.

Cumulative Impacts—There would be no cumulative long-term adverse impacts related to Alternative 1. However, future possible expansion of FOCL for the fort to ocean trail and vicinity would require trailheads with limited parking, and thus there could be cumulative minor long-term adverse impacts to farmlands of statewide importance.

Conclusion—There would be negligible long-term adverse impacts on prime, unique, and other special designated farmlands by Alternative 1.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.6.3 Alternative 2—River Day Use Area/Airport Site

Analysis—Clatsop County has zoned the RDUA for agricultural purposes, however it has not been used as such in recent years. There are no current plans to use the RDUA for agricultural purposes. Farmlands of statewide importance occur at the Park-and-Ride facility, but not within the RDUA. There may be minor adverse impacts to surrounding agricultural areas (particularly north of the Airport site) during the construction of the RDUA, but these would be short-term impacts.

Cumulative Impacts—The construction and use of the RDUA would not affect any soils considered prime farmland and/or soils of statewide importance. The Astoria Airport has plans to construct facilities on all parcels that can be developed. There may be further degradation of soils when and if the Astoria Airport constructs additional facilities near the Park-and-Ride site. Consequently, Alternative 2 in addition to other foreseeable actions (i.e. fort to ocean trail) could have a cumulative long-term minor adverse impact on statewide important farmland and no impact on prime farmland.

Conclusion—Alternative 2 would have a long-term minor adverse impact upon farmlands of statewide importance and a negligible long-term adverse impact upon prime farmland.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.6.4 Alternative 3—River Day Use Area/West County Site

Analysis—Farmlands of statewide importance occur at the Park-and-Ride facility, but not within the RDUA. The West County Site is in an area that is planned for build-out as a business park. There are no plans for future use for agricultural purposes.

Cumulative Impacts—The cumulative impacts related to the RDUA are the same as Alternative 2. At the Park-and-Ride facility, lands currently designated of statewide importance would have to be changed. There may be further degradation of soils when and if additional Business Park facilities and Business 101 are constructed near the Park-and-Ride site. Consequently, Alternative 3 in addition to other foreseeable actions (i.e. fort to ocean trail)

could have a cumulative long-term minor adverse impact on statewide important farmland and no impact on prime farmland.

Conclusion—Alternative 3 would have a long-term minor adverse impact upon farmlands of statewide importance and a negligible impact upon prime farmland. There would be no impairment of FOCL resources or values from this alternative.

5.6.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—Farmlands of statewide importance do not occur within the dispersed parking areas or within the RDUA. There may be minor adverse impacts to surrounding agricultural areas during the construction of the RDUA, but these would be short-term impacts.

Cumulative Impacts—Cumulative impacts are the same as Alternative 2 for the RDUA, but there are no cumulative long-term adverse impacts related to the dispersed parking locations, as these sites are completely developed. Consequently, Alternative 4 in addition to other foreseeable actions (i.e. fort to ocean trail) could have a cumulative long-term minor adverse impact on statewide important farmland and no impact on prime farmland.

Conclusion—Alternative 4 would have a long-term minor adverse impact upon farmlands of statewide importance and a negligible impact upon prime farmland.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.7 Solid and Hazardous Wastes

5.7.1 Methodology

Impact analysis centers on minimization of waste generation during construction as well as on any hazardous waste remediation necessary as part of site preparation.

Basis of Analysis—

Construction Wastes—Impacts are qualitatively evaluated in terms of potential generation of solid waste materials as well as opportunities for reuse and recycling or construction materials.

Hazardous Waste Contamination—Impacts are discussed concerning the potential presence, handling, and disposal of hazardous wastes associated with renovation, demolition, and construction.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no generation of solid, special, or hazardous wastes beyond existing operational background levels. Very limited opportunities would be available to incorporate recycling strategies.
- **Minor**—There would be generation of solid or hazardous wastes, but quantities of solid wastes would be manageable by use of on-site construction waste dumpsters and amounts of special or solid wastes would be managed through small service contracts or purchase orders. There would be some limited opportunities to incorporate recycling strategies.

- **Moderate**—Solid and/or special wastes would be generated at levels requiring special contracts for removal, handling, and disposal off site. Any hazardous waste would be manageable through the use of small contracts or purchase orders. There would be opportunities to incorporate recycling and/or other waste reduction strategies.
- **Major**—Solid wastes as well as hazardous wastes would be generated at levels requiring specialized contractors to remove, handle and disposed of the wastes. There would be a substantial opportunity to incorporate recycling and/or other waste reduction strategies.
- **Duration:**

  - **Short-Term**—Changes in waste generation during a period of one year or less.
  - **Long-Term**—Changes in waste generation lasting over one year.

5.7.2 Alternative 1—No Action Alternative

Analysis—The No Action Alternative would not develop the RDUA or the associate Park-and-Ride, therefore no associated solid or hazardous waste would be generated. No known hazardous materials as defined by the Resource Conservation and Recovery Act (RCRA) are known to occur in the existing boundaries of FOCL.

Cumulative Impacts—There would be minimal solid waste generated from a continuation of on-going, routine maintenance and operation of FOCL, however there may be a short-term increase in solid waste generation during the construction of the proposed Lewis and Clark Trail from the fort to the ocean. Future foreseeable actions outside of FOCL that may impact the solid waste stream include an increase in tourist traffic in the area, and future development near FOCL. An increase in tourists would correspondingly increase the amount of solid waste accumulated regionally and within FOCL. This would have a long-term, minor increase in solid waste generation. Cumulative impacts would be short- and long-term, negligible in intensity and adverse on the solid waste stream at FOCL.

Conclusion—There would be a negligible cumulative impacts with implementation of the No Action Alternative.

5.7.3 Alternative 2—RDUA/Airport Site

Analysis—The subsequent remediation at the RDUA from the former logging operations could be a cause of concern and a Level I Site Assessment would be required for this site prior to acquisition. There would also be some removal of woody vegetation, former logging pilings, and fill material required to develop the RDUA. This would result in a short-term, minor, adverse impact on solid waste generation. It is possible that a Level I Site Assessment would be required if the airport site were developed. In order to develop this site there would need to be some removal of woody vegetation and fill that could result in a short-term, minor, adverse impact on solid waste generation. Incorporating recycling services or containers at the RDUA and Park-and-Ride site could reduce some of the solid waste.

Cumulative Impacts—There would be minimal solid waste generated from a continuation of on-going, routine maintenance and operation of FOCL, however there may be a short-term increase in solid waste generation during the construction of the proposed trailhead. Future development of the airport may result in an increase in solid waste generation and/or an increased possibility of a hazardous materials release. This could have a long-term, minor, adverse impacts. Future foreseeable actions outside of FOCL that may impact the solid waste

stream include an increase in tourist traffic in the area, a proposed realignment of Business 101, and/or future development of the North Coast Business Park. This would have a long-term, minor increase in solid waste generation due to this additional development. Implementation of this alternative, in combination with future development at the airport and the Business Park, the proposed realignment of Business 101, and FOCL's proposed expansion would result in an increase in the amount of construction waste if implementation occurred simultaneously resulting in a short-term moderate adverse impact to the waste stream.

Conclusion—This alternative would have a short-term, minor adverse impact on solid waste generation during the construction associated with the RDUA and the airport Park-and-Ride site.

5.7.4 Alternative 3—River Day Use Area/West County Site

Analysis—The program and resulting solid waste concerns for the RDUA are the same as in Alternative 2. There would be some removal of woody vegetation, fill material, and other solid wastes associated with grading and paving the West County site. This would result in a short-term, minor adverse impact on solid waste generation.

Cumulative Impacts—The cumulative impacts on solid waste for the RDUA in this alternative are similar to those in Alternative 2. Future foreseeable actions include development at the North Coast Business Park, which could result in an increase of solid waste generation and/or an increased possibility of a hazardous materials release. The proposed realignment of Highway 101 would generate additional solid waste in the form of woody vegetation, grading, and fill material. Another future foreseeable action outside of FOCL that may impact the solid waste stream includes an increase in tourist traffic in the area. This would have a long-term, minor increase in solid waste generation. In order to mitigate this potential increase in solid waste generation FOCL staff could encourage recycling efforts near the park borders. Other actions in addition to this alternative would result in cumulative impacts that would be short- and long-term, minor and adverse.

Conclusion—This alternative would have short- and long-minor adverse impacts on solid waste generation during the construction associated with the RDUA and the airport Park-and-Ride site.

5.7.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The program and resulting solid waste concerns for the RDUA are the same as in Alternative 2. The dispersed parking uses existing sites and therefore has no need of solid/hazardous waste removal or Level I assessments. Incorporating appropriate recycling services/containers at the RDUA and dispersed parking sites could mitigate some of this additional solid waste.

Cumulative Impacts—The cumulative impacts on solid waste in this alternative for the RDUA are similar to those in Alternative 2. There would be a minor adverse impact at the dispersed parking sites with additional solid waste accumulated that would come with the FOCL visitors using dispersed parking facilities. Future foreseeable actions outside of FOCL that may impact the solid waste stream include an increase in tourist traffic in the area, and future development near FOCL. This would have a long-term, minor increase in solid waste generation due to this additional development. In order to mitigate this potential increase in solid waste generation

FOCL staff could encourage recycling efforts near the park borders. The cumulative impact on the sites associated with this project and foreseeable future actions would have a negligible impact on FOCL.

Conclusion—This alternative would have short- and long-term, minor adverse impacts on solid waste generation during the construction associated with the RDUA and the airport Park-and-Ride site. This would have a negligible effect on park resources.

5.8 Impacts on Visitor Experience

5.8.1 Methodology

Impact analysis focuses on the direct impacts to the visitors and staff of FOCL and possible impacts to the regional community in general from potential development of the River Day Use Area and the Fort Clatsop Park-and-Ride facility or dispersed parking.

Intensity, Duration, and Type of Impact:

- **Negligible**—Conditions would remain essentially unchanged from the current situation.
- **Minor**—There would be small noticeable improvements or deterioration in the physical accessibility to FOCL, and in educational opportunities.
- **Moderate**—Educational opportunities associated both with indoor exhibits and outdoor interpretive space would be noticeably improved or noticeably deteriorated.
- **Major**—Educational opportunities would optimal both indoors and out, or they would be considerably worse than under current conditions.
- **Duration:**
    - **Short-Term**—Lasting only during construction.
    - **Long-Term**—Permanent post-construction changes.

5.8.2 Alternative 1—No-Action Alternative

Analysis—If no action were taken visitors would experience limited parking availability, longer waits, and reduced opportunities to access and experience the park and the visitor center. Noise levels would increase and the quality of regional visitor services (such as transportation) would decrease. Visitor experience would be adversely impacted due to these constraints. Automobiles, buses, and recreational vehicles would continue to park at the visitor center, which would negatively effect the visitor experience due to noise, human caused light and localized air quality degradation. Capacities for visitor management and interpretation would be exceeded on an on-going basis. Taking no action would result in short- and long-term, moderate adverse impacts to visitor experience.

Cumulative Impacts Analysis—Foreseeable actions at FOCL would include actions identified in the 1995 GMP. These future actions include development of the fort to ocean trail, boundary expansion and addition of new staff. Cumulatively, these actions would result in short- and long-term, minor beneficial impacts to visitor experience by creating more options for visitor dispersal and providing a better understanding of the Lewis and Clark winter encampment story. These beneficial impacts would partially offset the adverse impacts to visitors by disturbances from the visitor center parking lot.

Conclusion—The No-Action Alternative would result in short- and long-term, moderate adverse impact to the visitor experience.

5.8.3 Alternative 2—River Day Use Area/Airport Site

Analysis—This alternative would provide opportunities for dispersal of visitors and day activities in picnic areas and along the shore of Lewis and Clark River. Visitors at the historic zone at FOCL would experience improvements to their understanding of the Lewis and Clark story because there would be less crowding and more opportunities for visitor contact with NPS staff. Minimizing parking in the visitor center parking lot during the bicentennial would eliminate most sources of human caused noise and light that could disrupt the interpretation of the winter encampment story. This alternative would result in a short- and long-term, minor beneficial impact to visitor experience.

The location of the Astoria Airport park-and-ride site could have a minor, adverse, impact to visitor experience. Adverse impacts could result because the proposed parking area would be at the airport and bordered to the north and east by commercial and industrial buildings, which would likely be incompatible with a visitor's perceived image of a NPS unit. Although the physical image of the park-and-ride site needs to minimize the visual effects of nearby development, the minor adverse impacts would be partially offset by the extra time they spend at these sites, which would allow additional learning of the FOCL story from exhibits and orientation from FOCL rangers.

Cumulative Impacts Analysis—Foreseeable actions at FOCL would include actions identified in the 1995 GMP. These future actions include development of the fort to ocean trail, boundary expansion and addition of new staff. Cumulatively, these actions would result in short- and long-term, minor beneficial impacts to visitor experience by creating more options for visitor dispersal and providing a better understanding of the Lewis and Clark winter encampment story.

Foreseeable future actions outside the FOCL boundaries include development of the area surrounding the park-and-ride site with industrial or non-retail commercial development. Additional development on the west side of the park-and-ride site could have a minor, adverse impact of the visitor experience. New development west of the proposed park-and-ride site could block the view of the facility and could be confusing to visitors. These potential impacts would range from short term, during the period of construction, to long-term, with industrial development in the immediate vicinity of the park-and-ride site. Occasional loud noises from aircraft operations could adversely impact visitor experience, however these noise intrusions would not be constant. Future actions such as new industrial development and occasional aircraft noise would result in minor adverse impacts to visitor experience, however they would be a small component of the overall cumulative impact on visitor experience, which would be short- and long-term, minor in intensity and beneficial.

Conclusion—This alternative would result in a long-term, minor beneficial impact to the visitor experience.

5.8.4 Alternative 3—River Day Use Area/West County Site

Analysis—The impacts of this alternative is similar to Alternative 2. This alternative would provide opportunities for dispersal of visitors and day activities in picnic areas and along the shore of Lewis and Clark River. Visitors would be able to view the Lewis and Clark River

valley and estuarine wetlands in much the same way as the Lewis and Clark expedition. Visitors at the historic zone at FOCL would experience improvements to their understanding of the Lewis and Clark story because there would be less crowding and more opportunities for visitor contact with NPS staff. Minimizing parking in the visitor center parking lot during the bicentennial would eliminate most sources of human caused noise and light that could disrupt the interpretation of the winter encampment story resulting in a short- and long-term, minor beneficial impact to visitor experience. The site is rural and provides an adequate to the setting of the Lewis and Clark story. The site would be located on U.S. 101, which would make access easier for visitors. Proposed development of the park-and-ride facility at the West County site would result in negligible impacts to visitor experience.

Cumulative Impacts Analysis—Cumulative impacts area similar to Alternative 2. Foreseeable actions at FOCL would include actions identified in the 1995 GMP. These future actions include development of the fort to ocean trail, boundary expansion and addition of new staff. Cumulatively, these actions would result in short- and long-term, minor beneficial impacts to visitor experience by creating more options for visitor dispersal and providing a better understanding of the Lewis and Clark winter encampment story. Although the West County Site is in an undeveloped area, foreseeable future actions include Clatsop County's intent to develop this area as a business park. If development occurs in the immediate vicinity of the proposed park-and-ride facility, visitors' perception of the facility as an extension of FOCL would likely be adversely impacted. However, because of the moratorium placed on development due to the USACE issue with construction of the business park's internal loop road, it is unlikely that any development would occur in the immediate vicinity of the proposed park-and-ride facility in the short term. Extension of Business 101 in the vicinity of the proposed park-and-ride facility would create adverse impacts to visitor experience, especially if construction were simultaneous with construction of industrial facilities. These cumulative impacts would be moderate and adverse, but would only last as long as the construction. This alternative added to the cumulative impact of other foreseeable actions would result in short- and long-term, minor beneficial cumulative impacts to visitor experience.

Conclusion—This alternative would result in a short- and long-term, minor beneficial impact to the visitor experience.

5.8.5 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The impacts of this alternative is similar to Alternative 2. This alternative would provide opportunities for dispersal of visitors and day activities in picnic areas and along the shore of Lewis and Clark River. Visitors at the historic zone at FOCL would experience improvements to their understanding of the Lewis and Clark story because there would be less crowding and more opportunities for visitor contact with NPS staff. Minimizing parking in the visitor center parking lot during the bicentennial would eliminate most sources of human caused noise and light that could disrupt the interpretation of the winter encampment story resulting in a short- and long-term, minor beneficial impact to visitor experience. Visitor experience at the dispersed parking areas would be limited to exhibits that would provide an overview of the Lewis and Clark story in the region and at FOCL. These locations are in urban areas so there would be no visual sense or introduction to FOCL. However, dispersed parking in these urban areas would allow visitors the opportunity to visit other attractions near the parking lots before or after their visit to FOCL.

Cumulative Impacts Analysis—Cumulative impacts area similar to Alternatives 2 and 3. Foreseeable actions at FOCL would include actions identified in the 1995 GMP. These future actions include development of the fort to ocean trail, boundary expansion and addition of new staff. Cumulatively, these actions would result in short- and long-term, minor beneficial impacts to visitor experience by creating more options for visitor dispersal and providing a better understanding of the Lewis and Clark winter encampment story.

Conclusion—This alternative would have a short-term and long-term, moderate beneficial impact to the visitor experience.

5.9 Soundscape

Basis of Analysis—Increases in the number of visitors to FOCL could result in disturbances to visitors by noise associated with the visitor center parking lot. The basis of analysis is the potential disturbance to visitors and the ability of FOCL interpretive staff to tell the story of the deep forest quiet experienced by the Lewis and Clark expedition.

Methodology—Impact analysis focused on potential increases in human caused noise at FOCL. The potential impacts of the visitor center parking lot, in both the short- and long-term, action alternatives and other non-NPS actions are considered.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing conditions in terms of human caused noise.
- **Minor**—Small changes in human caused noise would occur primarily in areas directly related to FOCL.
- **Moderate**—Noticeable changes in human caused noise would by experienced at the fort.
- Major—Substantial changes in audible levels of human caused noise would be noticeable at the fort.
- **Duration:**
    - **Short-Term**—Impacts would be primarily associated with construction-related activities and during the bicentennial, through the year 2006.
    - **Long-Term**—Impacts would be semi-permanent to permanent changes associated with vehicle parking at FOCL and human caused noise from beyond FOCL boundaries, beyond the year 2006.

5.9.1 Alternative 1—No Action Alternative

Analysis—Taking no action would result in continuation of visitor parking at the FOCL parking lot. Noises from a typical day at the FOCL parking lot could be heard in the vicinity of the visitor center, however they are partly muffled by vegetation between the parking lot and fort. On weekends during the peak season and during the bicentennial, the anticipated increase in visitors would likely keep the parking lot at full capacity, including buses. Noise from a full parking lot, particularly buses are noticeable at the fort, and would also be noticeable by visitors. These human caused noises would make interpretation of the Lewis and Clark winter encampment story more difficult for FOCL staff. Noise levels from the FOCL parking lot would result in a short- and long-term, moderate adverse impact to the soundscape of FOCL.

Cumulative Impacts—A foreseeable action at FOCL includes construction of the trailhead for the fort to ocean trail. This construction activity might be heard at the fort, but noise would only last as long as the construction activities, which would be completed prior to the bicentennial and not during weekends. This future action would result in short-term, minor impacts to the soundscape. In the past, logging operations could occasionally be heard at the fort. With the proposed expansion of the FOCL boundaries, logging operations would be farther away from the fort and noise from these operations would be less audible, and likely not heard at all. Although logging operations would result in a continuation of occasional noise from logging trucks driving along Fort Clatsop Road, boundary expansion would result in a short- and long-term, minor beneficial impact to the FOCL soundscape. Past, present and future aircraft operations result in occasional intrusions of the soundscape at FOCL, which create short- and long-term, minor adverse impacts to the soundscape. A reasonably foreseeable action could be regaining commercial aviation operations at the airport, which would result in more frequent flights and more frequent noise intrusion at the fort. Although the expansion of FOCL would result in minor beneficial impacts, the cumulative impact of taking no action, in conjunction with other sources of human caused noise would be noticeable by staff and visitors and would result in both short- and long-term moderate adverse impacts to the soundscape of FOCL.

Conclusion—Taking no action would result in short- and long-term, moderate adverse impacts to the soundscape of FOCL.

Impairment—Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of FOCL; (2) key to the natural or cultural integrity of FOCL or to opportunities for enjoyment of the memorial; (3) identified as a goal in the memorial's GMP or other relevant NPS planning documents, there would be no impairment of the memorial's resources or values.

5.9.2 Alternative 2—River Day Use Area/Airport Site

Analysis—The RDUA is in a rural environment and exposure to human caused sound would likely be limited to the noises from vehicles on Fort Clatsop Road, occasional aircraft and possibly some logging operations. The RDUA will be used for overflow parking and day use activities, which would create a low level of noise, however noise generated at RDUA would not likely be audible at the fort. Due to the proximity of the RDUA to the historic zone at FOCL, construction of the RDUA—which would be louder than typical day use activities—might be audible at the fort, which could distract visitors and disturb interpreters resulting in a short-term, minor adverse impact to the FOCL soundscape. Visitor parking during the bicentennial and during peak weekends following the bicentennial would not be permitted at the visitor center. This would eliminate the most notable source of human caused noise at the fort resulting in short- and long-term, moderate beneficial impacts to the FOCL soundscape. Eliminating these human caused sources of noise would reduce distractions to visitors and interpretation staff, which would increase visitors understanding of the deep forest quiet experienced by the Lewis and Clark expeditions. Visitors parking at the airport site would be exposed to the noise of aircraft operations and vehicles driving on airport roads. These types of noises would be expected from these airport activities. The distance between the airport (and construction of the Park-and-Ride facility) and the historic zone at FOCL is far enough that human caused noise from the airport would not be audible, resulting in negligible impacts to the FOCL soundscape.

Cumulative Impacts—Foreseeable future actions, such as the FOCL boundary expansion, would result in protection of the FOCL soundscape by keeping potential sources of human caused noise farther away from the historic zone at FOCL, resulting in a short- and long-term moderate, beneficial impact to the soundscape by minimizing distractions to visitors. Another foreseeable action includes construction of the trailhead for the fort to ocean trail. This construction activity might be heard at the fort, but noise would only last as long as the construction activities—which would not likely occur on weekends—would be completed prior to the bicentennial. This future action would result in short-term, minor impacts to the soundscape. In the past, logging operations could occasionally be heard at the fort. With the proposed expansion of the FOCL boundaries, logging operations would be farther away from the fort and noise from these operations would be less audible, and likely not heard at all. Although logging operations would result in a continuation of occasional noise from logging trucks driving along Fort Clatsop Road, boundary expansion would result in a short- and long-term, minor beneficial impact to the FOCL soundscape. Aircraft operations would continue to produce human caused noise on occasion, however a future foreseeable action such as regaining commercial aviation could introduce more frequent noise, which could result in distractions to visitors and interpretative staff. This could have short- and long-term minor, adverse impacts to the FOCL soundscape. Implementation of this alternative would result in noise from construction activities, however the cumulative intensity of this and other individual construction actions would result in short-term, minor adverse impacts to the FOCL soundscape, even if they were implemented simultaneously. Any minor adverse cumulative impacts associated with implementation of this alternative would be offset by the moderate beneficial impacts resulting from the actions proposed.

Conclusion—Implementation of Alternative 2 would result in impacts that would be short- and long-term, moderate in intensity and beneficial to the soundscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.9.3 Alternative 3—River Day Use Area/West County Site

Analysis—The impact of the RDUA to the FOCL soundscape would be similar to Alternative 2. The RDUA is in a rural environment and exposure to human caused sound would likely be limited to the noises from vehicles on Fort Clatsop Road, occasional aircraft and possibly some logging operations. The RDUA will be used for overflow parking and day use activities, which would create a low level of noise, however noise generated at RDUA would not likely be audible at the fort. Due to the proximity of the RDUA to the historic zone at FOCL, construction of the RDUA—which would be louder than typical day use activities—might be audible and create a short-term, minor adverse impact to the FOCL soundscape. Visitor parking during the bicentennial and during peak weekends following the bicentennial would not be permitted at the visitor center. This would eliminate the most notable source of human caused noise at the fort resulting in short- and long-term, moderate beneficial impacts to the FOCL soundscape. Eliminating these human caused sources of noise would reduce distractions to visitors and interpretation staff, which would increase visitors understanding of the deep forest quiet experienced by the Lewis and Clark expeditions. Development of the Park-and-Ride at the West County site would be in an undeveloped area where the only notable sources of human caused noise would be vehicles along U.S. 101 and occasional aircraft. Construction of the Park-and-Ride facility would result in noise during construction activities, however this site is far enough away from the FOCL that construction noises would not likely be audible, resulting in negligible impacts to the FOCL soundscape.

Cumulative Impacts—Foreseeable future actions such as the FOCL boundary expansion would result in protection of the FOCL soundscape by keeping potential sources of human caused noise farther away from the historic zone at FOCL, resulting in a short- and long-term moderate, beneficial impact to the soundscape. Construction of reasonably foreseeable future actions such as development in the North Coast Business Park, would not likely be heard at the fort because of the distance from the business park and the fort, resulting in negligible impacts to the soundscape. Another foreseeable action includes construction of the trailhead for the fort to ocean trail. This construction activity might be heard at the fort, but noise would only last as long as the construction activities—and would not likely occur on weekends—would be completed prior to the bicentennial. This future action would result in short-term, minor impacts to the soundscape. In the past, logging operations could occasionally be heard at the fort. With the proposed expansion of the FOCL boundaries, logging operations would be farther away from the fort and noise from these operations would be less audible, and likely not heard at all, which would minimize disturbances to visitors. Although logging operations would result in a continuation of occasional noise from logging trucks driving along Fort Clatsop Road, boundary expansion would result in a short- and long-term, minor beneficial impact to the FOCL soundscape. Aircraft operations would continue to produce human caused noise on occasion, however a future foreseeable action such as regaining commercial aviation could introduce more frequent noise, resulting in short- and long-term minor, adverse impacts to the FOCL soundscape. Implementation of this alternative would result in noise from construction activities, however the cumulative intensity of this and other individual construction actions would result in short-term, minor adverse impacts to the FOCL soundscape, even if they were implemented simultaneously. Any minor adverse cumulative impacts associated with implementation of this alternative would be offset by the moderate beneficial impacts resulting from the actions proposed.

Conclusion—Implementation of Alternative 3 would result in impacts that would be short- and long-term, moderate in intensity and beneficial to the soundscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.9.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The RDUA is in a rural environment and exposure to human caused sound would likely be limited to the noises from vehicles on Fort Clatsop Road, occasional aircraft and possibly some logging operations. The RDUA will be used for overflow parking and day use activities, which would create a low level of noise, however noise generated at RDUA would not likely be audible at the fort. Due to the proximity of the RDUA to the historic zone at FOCL, construction of the RDUA—which would be louder than typical day use activities—might be audible and create a short-term, minor adverse impact to the FOCL soundscape. Visitor parking during the bicentennial and during peak weekends following the bicentennial would not be permitted at the visitor center. This would eliminate the most notable source of human caused noise at the fort resulting in short- and long-term, moderate beneficial impacts to the FOCL soundscape. Existing parking lots proposed to be utilized are in urban areas that are exposed to human caused noise typical of urban areas. The parking lots are remote from FOCL and would result in negligible impacts to the soundscape of FOCL. Eliminating these human caused sources of noise would reduce distractions to visitors and interpretation staff, which would increase visitors understanding of the deep forest quiet experienced by the Lewis and Clark expeditions.

Cumulative Impacts—Foreseeable future actions such as the FOCL boundary expansion would result in protection of the FOCL soundscape by keeping potential sources of human caused noise farther away from the historic zone at FOCL, resulting in a short- and long-term moderate, beneficial impact to the soundscape. Another foreseeable action includes construction of the trailhead for the fort to ocean trail. This construction activity might be heard at the fort, but noise would only last as long as the construction activities—which would not likely occur on weekends—would be completed prior to the bicentennial. This future action would result in short-term, minor impacts to the soundscape. In the past, logging operations could occasionally be heard at the fort. With the proposed expansion of the FOCL boundaries, logging operations would be farther away from the fort and noise from these operations would be less audible, and likely not heard at all. Although logging operations would result in a continuation of occasional noise from logging trucks driving along Fort Clatsop Road, boundary expansion would result in a short- and long-term, minor beneficial impact to the FOCL soundscape. Aircraft operations would continue to produce human caused noise on occasion, however a future foreseeable action such as regaining commercial aviation could introduce more frequent noise, resulting in short- and long-term minor, adverse impacts to the FOCL soundscape. Implementation of this alternative would result in noise from construction activities only at the RDUA, however the cumulative intensity of this and other individual construction actions would result in short-term, minor adverse impacts to the FOCL soundscape, even if they were implemented simultaneously. Any minor adverse cumulative impacts associated with implementation of this alternative would be offset by the moderate beneficial impacts resulting from the actions proposed.

Conclusion—Implementation of Alternative 4 would result in impacts that would be short- and long-term, moderate in intensity and beneficial to the soundscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.10 Lightscape

Basis of Analysis—The basis of analysis is the ability of FOCL interpretive staff to tell the story—and for visitors to experience—the darkness of a deep forest, or the night skies experienced by the Lewis and Clark expedition.

Methodology—Impact analysis focused on potential increases in sources of light at FOCL and sources of ambient light from regional development. The potential impacts of the visitor center parking lot, in both the short- and long-term, action alternatives and other non-NPS actions are considered.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing light or night sky conditions.
- **Minor**—Small changes in localized light and night skies would be noticeable by visitors.
- **Moderate**—Noticeable changes in localized light and a decrease in the visibility of night skies would be experienced at the fort.
- **Major**—Substantial increases in localized light and a decrease in the visibility of stars and planets in the night sky would be noticeable at the fort.

- **Duration:**

  - **Short-Term**—Impacts would be primarily associated with construction-related activities and during the bicentennial years, through the year 2006.
  - **Long-Term**—Impacts would be semi-permanent to permanent changes associated with vehicle parking at FOCL and human caused noise from beyond FOCL boundaries, beyond the year 2006.

5.10.1 Alternative 1—No Action Alternative

Analysis—Taking no action would result in continued parking at the FOCL visitor center during the bicentennial and peak weekends following the bicentennial. Higher numbers of visitors would result in more vehicles in the parking lot at towards the end of the day when the memorial closes. During the summer months this would likely result in negligible impacts to the lightscape of FOCL, however during the shoulder seasons and colder months, lights from vehicles would be more noticeable and result in a minor short- and long-term, adverse impact to the lightscape at FOCL. The adverse impacts to the lightscape would hinder FOCL interpretive staff's ability to tell the story of the dark forest environment that the Lewis and Clark expedition experienced.

Cumulative Impacts—There are no other actions at FOCL that would cumulatively impact the lightscape at FOCL, however proposed development in the vicinity of FOCL could result in adverse impacts to the memorial. Reasonably foreseeable actions include the development of the 270-acre North Coast Business Park, which is located northwest of the memorial and the proposed build-out of the Astoria Airport to the north. These developments would add light sources such as street lighting, lighted signs, parking lot lighting and general security lighting around buildings. The cumulative intensity of these proposed developments in addition to past development in the cities of Warrenton and Astoria and Clatsop County, would continue to degrade the night skies above FOCL. This would result in short- and long-term, moderate adverse impacts to the lightscape at FOCL. The cumulative impact of taking no action and the other foreseeable actions in the immediate vicinity of FOCL would create a situation where visitors at FOCL would see fewer stars and planets than did the members of the Lewis and Clark expedition and would make the interpretation of the dark forest environment more difficult for FOCL staff. Cumulative impacts would be short- and long-term, moderate in intensity and adverse to the lightscape at FOCL. To mitigate the cumulative impacts from development beyond FOCL boundaries, staff could coordinate with city staff at the cities of Warrenton and Astoria and Clatsop County to encourage or require the use of lighting fixtures that minimize adverse effects to the night sky.

Conclusion—Taking no action would result in short- and long-term, moderate adverse impacts to the lightscape at FOCL.

Impairment—Because there would be no major, adverse impacts to a resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of FOCL; (2) key to the natural or cultural integrity of FOCL or to opportunities for enjoyment of the memorial; (3) identified as a goal in the memorial's GMP or other relevant NPS planning documents, there would be no impairment of the memorial's resources or values.

5.10.2 Alternative 2—River Day Use Area/Airport Site

Analysis—The RDUA would be created for day use activities, however lighting fixtures would be required for safety, particularly for off-season, special event parking. Development of the Park-and-Ride facility at the airport would require street lighting for safety. Lighting fixtures would be used that focus light towards the ground, resulting in short- and long-term, negligible impacts to the night sky. Short- and long-term, minor beneficial impacts would result from using the RDUA and airport site for parking during the bicentennial by minimizing the effect of vehicle lighting at the fort.

Cumulative Impacts—There are no other actions at FOCL that would cumulatively impact the lightscape at FOCL, however proposed development in the vicinity of FOCL could result in adverse impacts to the memorial. Reasonably foreseeable actions include the development of the 270-acre North Coast Business Park, which is located northwest of the memorial and the proposed build-out of the Astoria Airport to the north. These developments would add light sources such as street lighting, lighted signs, parking lot lighting and general security lighting around buildings. The cumulative intensity of these proposed developments in addition to past development in the cities of Warrenton and Astoria and Clatsop County, could continue to degrade the night skies above FOCL. To mitigate the cumulative impacts from development beyond FOCL boundaries, staff could coordinate with city staff at the cities of Warrenton and Astoria and Clatsop County to encourage or require the use of lighting fixtures that minimize adverse effects to the night sky. This could result in short- and long-term, minor adverse impacts to the lightscape at FOCL. However, the cumulative effects of this alternative and the other foreseeable actions in the immediate vicinity of FOCL would create a situation where visitors at FOCL could better understand the dark forest environment that the members of the Lewis and Clark expedition experienced. Cumulative impacts would be short- and long-term, minor in intensity and adverse to the lightscape at FOCL.

Conclusion—Although removing parking from the visitor center during the bicentennial would result in minor beneficial impacts at the fort, the cumulative effects of this alternative and past and foreseeable future development in the region, even if mitigated, would result in short- and long-term, minor adverse impacts to the lightscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.10.3 Alternative 3—River Day Use Area/West County Site

Analysis—Impacts for the RDUA for this alternative are similar to those described in Alternative 2. The RDUA would be created for day use activities, however lighting fixtures would be required for safety, particularly for off-season, special event parking. Development of the Park-and-Ride facility at the west county site would require street lighting for safety, particularly at the proposed intersection with U.S. 101. Lighting fixtures would be used that focus light towards the ground, resulting in short- and long-term, negligible impacts to the night sky. Short- and long-term, minor beneficial impacts would result from using the RDUA and west county site for parking during the bicentennial by minimizing the effect of vehicle lighting at the fort.

Cumulative Impacts—Similar to both Alternatives 1 and 2, there are no other actions at FOCL that would cumulatively impact the lightscape at FOCL, however proposed development in the vicinity of FOCL could result in adverse impacts to the memorial. Reasonably foreseeable

actions include the development of the 270-acre North Coast Business Park, which is located northwest of the memorial and the proposed build-out of the Astoria Airport to the north. These developments would add light sources such as street lighting, lighted signs, parking lot lighting and general security lighting around buildings. The cumulative intensity of these proposed developments in addition to past development in the cities of Warrenton and Astoria and Clatsop County, could continue to degrade the night skies above FOCL. To mitigate the cumulative impacts from development beyond FOCL boundaries, staff could coordinate with city staff at the cities of Warrenton and Astoria and Clatsop County to encourage or require the use of lighting fixtures that minimize adverse effects to the night sky. This could result in short- and long-term, minor adverse impacts to the lightscape at FOCL. However, the cumulative effects of this alternative and the other foreseeable actions in the immediate vicinity of FOCL would create a situation where visitors at FOCL could better understand the dark forest environment that the members of the Lewis and Clark expedition experienced. Cumulative impacts would be short- and long-term, minor in intensity and adverse to the lightscape at FOCL.

Conclusion—The potential impacts are similar to Alternative 2. Removing parking from the visitor center during the bicentennial would result in minor beneficial impacts at the fort, however the cumulative effects of this alternative in addition to past and foreseeable future development in the region, even if mitigated, would result in short- and long-term, minor adverse impacts to the lightscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.10.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—Impacts from this alternative would be slightly less than in Alternative 2 and 3 because no new lighting would be required for the dispersed parking sites. The RDUA would be created for day use activities, however lighting fixtures would be required for safety, particularly for off-season, special event parking. Utilization of the proposed Park-and-Ride facilities dispersed throughout the region, would be served by existing street lighting. Lighting fixtures at the RDUA would utilize optics that focus light towards the ground, resulting in short- and long-term, negligible impacts to the night sky. Short- and long-term, minor beneficial impacts would result from using the RDUA and dispersed sites for parking during the bicentennial by minimizing the effect of vehicle lighting at the fort.

Cumulative Impacts—Similar to Alternatives 1, 2, and 3 there are no other actions at FOCL that would cumulatively impact the lightscape at FOCL, however proposed development in the vicinity of FOCL could result in adverse impacts to the memorial. Reasonably foreseeable actions include the development of the 270-acre North Coast Business Park, which is located northwest of the memorial and the proposed build-out of the Astoria Airport to the north. These developments would add light sources such as street lighting, lighted signs, parking lot lighting and general security lighting around buildings. The cumulative intensity of these proposed developments in addition to past development in the cities of Warrenton and Astoria and Clatsop County, could continue to degrade the night skies above FOCL. To mitigate the cumulative impacts from development beyond FOCL boundaries, staff could coordinate with city staff at the cities of Warrenton and Astoria and Clatsop County to encourage or require the use of lighting fixtures that minimize adverse effects to the night sky. This could result in short- and long-term, minor adverse impacts to the lightscape at FOCL. However, the cumulative effects of this alternative and the other foreseeable actions in the immediate vicinity of FOCL

would create a situation where visitors at FOCL could better understand the dark forest environment that the members of the Lewis and Clark expedition experienced. Cumulative impacts would be short- and long-term, minor in intensity and adverse to the lightscape at FOCL.

Conclusion—The potential impacts are similar to Alternatives 2 and 3. Removing parking from the visitor center during the bicentennial would result in minor beneficial impacts at the fort, however the cumulative effects of this alternative in addition to past and foreseeable future development in the region, even if mitigated, would result in short- and long-term, minor adverse impacts to the lightscape of FOCL.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.11 Socioeconomics

Basis of Analysis—Regional tourism is increasing, and the bicentennial would cause a spike in the number of visitors to FOCL. Impact analysis is discussed on the basis of general impacts on tourism and recreational opportunities in the region and impacts on the local and regional economy.

Methodology—Impact analysis focused on direct impacts to the local economy from construction, long-term operation, and possible impacts to the regional community in general from potential development of the RDUA and the Fort Clatsop Park-and-Ride facility. For purposes of analyzing potential impacts, the levels of intensity, duration, and type of impact are defined below.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing conditions in terms of community-business-FOCL interaction.
- **Minor**—Small changes in business activity would occur primarily in areas directly related to FOCL visitation and tourism. Community interaction would remain basically unchanged from current conditions.
- **Moderate**—Noticeable changes would occur in some sectors of local business related to construction and to visitation/tourism. Community-FOCL interactions would be somewhat modified.
- **Major**—Noticeable changes would occur in some sectors of local business related to construction and to visitation/tourism. Community-FOCL interactions would be noticeably modified.
- **Duration:**
    - **Short-Term**—Impacts would be primarily associated with construction-related activities.
    - **Long-Term**—Impacts would be associated semi-permanent to permanent post-construction activities.

5.11.1 Alternative 1—No-Action Alternative

Analysis—Neither the RDUA or the Park-and Ride sites would be developed if no action were taken, however, visitation levels to FOCL and the region would likely continue to increase due to the bicentennial. As tourism to FOCL and the surrounding area increases, regional economic benefits would increase. Jobs to handle this overflow of tourists may be created, however the number of jobs created would be less than if the RDUA site were developed and the SETD transit system was expanded. Implementation of this alternative would not provide any additional long-term economic benefits to the region. It is anticipated that a greater number of visitors would be visiting the park, but those individuals are not likely to stay if the park is perceived to be inadequate to visitor needs. In this alternative, tourists would continue to arrive directly at the visitor center, which could exceed capacity during peak days. Jobs that are created to handle the increased visitation may not last after the bicentennial. No construction would occur and no construction jobs would be created with this alternative, resulting in a short-term, minor, adverse impact to the local economy.

Cumulative Impacts—Tourism is becoming a primary industry in the region and the bicentennial would allow FOCL to capitalize on increasing numbers of tourists. Foreseeable future actions include hiring of seasonal staff, as described in the GMP, to accommodate anticipated increases in visitation. This would have a short-term, beneficial impact to the surrounding area and the local economy. Some of the short-term gains in visitation may be lost following the bicentennial, which would have a long-term, minor, adverse impact on the local economy. Future expansion and the construction of the Lewis and Clark National Trail at FOCL would create some short-term construction jobs, and the resulting trail may attract additional tourists to the fort, resulting in a long-term, minor beneficial impact on FOCL. In terms of the surrounding region, The bicentennial will draw an increased number of visitors to the area, which would lead to an increase in tourism dollars for the region. However, if crowded park conditions make FOCL a less desirable destination those short-term benefits might not extend past the bicentennial period. As a result, tourists may come to the area, but they may not stay and/or return. It is possible that some jobs created to handle the increase in tourists would be lost after the bicentennial. This would have a long-term, minor, adverse impact on the regional economy. Additionally, with this alternative the partnership with SETD would not expand its transit services to include FOCL. This could have a long-term, minor, adverse impact on the regional economy by providing fewer jobs with SETD to operate an expanded transit system. It could also have a long-term, minor, adverse impact on regional transit use. Those individuals who may use the expanded SETD services to commute to work, and particularly those that may work in the tourism and recreational industries, would have less travel options available. Other actions in addition to taking no action would result in cumulative impacts that would be short- and long-term, minor in intensity, and adverse to the socioeconomic conditions to FOCL and the surrounding community.

Conclusion—Although the No-Action Alternative would generate some short- and long-term economic gains in terms of increased tourist dollars to the region, it would not provide any short-term local construction jobs or service sector related jobs. This would result in a short-and long-term, minor, adverse affect to the local economy.

5.11.2 Alternative 2—River Day Use Area/Airport Site

Analysis—RDUA construction would provide additional visitor day use activities (i.e. picnic areas and a trailhead shelter) that would encourage visitors to stay within the park for a longer amount of time. Longer visits to the area could lead to an increase in the number of tourists

staying overnight in the area and using local restaurants. Construction of the RDUA and increased park capacity would have a short-term, direct effect on job creation within the area. There could be a need to hire some seasonal park staff for interpretation and maintenance of the RDUA. This would have a short-term, minor, beneficial impact on the regional economy. Increased tourism and publicity surrounding FOCL may lead to the indirect creation of additional service sector jobs in the area. This would have a long-term, minor, beneficial impact to the regional economy. The FOCL shuttle and the Park-and-Ride facility would allow visitors to explore the local area, which could lead to an increase in visitation and in tourism revenue for the local economy. This alternative would have a short-term, moderate beneficial impact to the region by employing workers during construction of the facility. This alternative expands services offered by SETD and would increase the number of jobs regional jobs with SETD. The airport site could provide a short-term, minor benefit to the local economy by providing more transportation opportunities to employees and visitors to the airport.

Cumulative Impacts—Implementation of this alternative would result in a minor multiplier effect on regional income by during construction of these facilities. Other actions including construction of the proposed fort to ocean trail, North Coast Business Park, and airport would result in short-term, minor beneficial impact on the local economy. The combination of other regional attractions and development of the RDUA and Park-and-Ride would expand tourism opportunities in the region leading to a long-term, minor, beneficial impact for the local economy. Over time, new businesses may be created to accommodate this increase in visitors to the area. This would lead to a long-term, minor beneficial effect on the local economy by multiple choices for visitors. Implementation of the Park-and-Ride facility could result in a small increase in jobs with SETD to handle this expansion of their services. It would also require SETD to maintain additional busses and construction additional storage for those buses. This would have a long-term, minor, benefit to the local economy. Other future foreseeable actions that may impact the local economy include the proposed realignment of Business 101. This type of future expansion and development could lead to a short-term increase in construction job creation resulting in a long-term, minor, beneficial impact to the local economy. Foreseeable future actions in addition to implementation of Alternative 2 would result in short- and long-term, minor beneficial impact to the local economy.

Conclusion—Implementing Alternative 2 would result in a minor, short- and long-term, beneficial impact on the local economy.

5.11.3 Alternative 3—River Day Use Area/West County Site

Analysis—Analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility in this alternative is the same as in Alternative 2. This site offers an additional benefit due to its easy access to Highway 101. This is a major service road for the area and would attract a number of visitors to FOCL based solely upon its location and would result in a long-term, minor, beneficial impact to the region.

Cumulative Impacts—Cumulative impacts for the RDUA are the same as Alternative 2. If construction of the Park-and-Ride occurred simultaneously with proposed expansion of the Business Park this could result in a short term, minor beneficial impact on the local economy. If the construction and future development of the business park did not occur simultaneously, there would have a long-term, minor beneficial impact on the local economy by spreading the construction dollars out over time. Construction activities for both the RDUA site and the proposed Park-and-Ride facility, taken in combination with potential construction of the business park would have short- and long-term, minor, beneficial impacts to the local economy

by employing area workers. There would be an added long-term, benefit to regional commuters by providing more opportunities to choose from within the regional transit system. Any added commuter traffic using the proposed Lewis and Clark shuttle may turn seasonal jobs into full time ones. Additional foreseeable future actions include the realignment of Business 101 and potential expansion of the Astoria Airport. This would add to the construction jobs already created by the Park-and-Ride and development of the Business Park, resulting in a short-term, moderate, beneficial impact to the local economy. Cumulative impacts of other foreseeable actions in addition to implementation of this alternative would result in long-term, moderate, beneficial impacts.

Conclusion—This alternative—like Alternative 2—would have a short- and long-term, minor beneficial impact on the local economy.

5.11.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The potential impacts for the day use activities at RDUA in this alternative is similar to Alternative 2 and 3. The difference between these alternatives is that a single Park-and-Ride facility would not be constructed. Rather, FOCL would work with SETD to develop a dispersed parking system around the region. The development of the dispersed parking may provide more service-sector jobs geared toward orientating visitors to FOCL and the region. Unlike Alternatives 2 and 3, this alternative would impact, and benefit, more than one regional economy. This multi-layered partnership between FOCL and the surrounding cities would attract multiple types of tourists; there may be some tourists who come to the area primarily to visit FOCL and end up exploring the nearby regions, and spending tourist dollars, using the shuttle system and vice-versa. The multi-modal center in downtown Astoria could offer visitors the opportunity to visit other attractions in Astoria and to shop its stores nearby. The intermodal center is next to the Astoria Trolley, which provides access to many attractions, restaurants and shops along the Columbia River waterfront. Visitors could be "captured" in other outlying parking areas in Seaside and in southwest Washington. Visitors at these locations would also have the opportunity to partake in other local activities while they wait for their scheduled visit to FOCL. All of these opportunities would have a long-term, moderate, beneficial impact on the regional economy.

Cumulative Impacts—Cumulative impacts related to the RDUA are similar to Alternative 2. This alternative would have a long-term, minor beneficial impact to the region by employing workers during construction of the facility. Implementation of this alternative would result in a minor multiplier effect on regional income by generating additional service sector jobs to cater to the increased numbers of tourists. SETD partnerships, marketing, and resulting shuttle links would result in a long-term, moderate beneficial impact to local economies by spreading visitors around the area during and beyond the bicentennial period. Additional foreseeable future actions include the realignment of Business 101 and potential expansion of the Astoria Airport. This would add to the construction jobs already created by the development of the RDUA, resulting in a short-term, moderate, beneficial impact to the local economy. Cumulative impacts of other foreseeable actions in addition to implementation of this alternative would result in long-term, moderate, beneficial impacts.

Conclusion—Alternative 4 would result in a long-term, moderate, beneficial impact on the local economies.

5.12 Transportation

Basis of Analysis—Increased tourism will increase the number of vehicles on the regional road system. Impacts to the local and regional road system and transit services will be discussed on the basis of parking capacities, road access, and mass transit. Issues of current or potential future intermodal access are also evaluated.

Methodology—Impact analysis focused on direct impacts to the regional road system and transit services from construction, long-term operation, in general from potential development of the RDUA and the Fort Clatsop Park-and-Ride facility.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing conditions in terms of regional road system, parking, transit services, or signage.
- **Minor**—Small changes roadways, parking, transit services, and signage would occur primarily in areas directly related to FOCL visitation and tourism.
- **Moderate**—Noticeable changes in the roadways, parking, transit services, and signage would occur in some areas related to construction and to visitation/tourism. Major—Significant changes would occur impacting roadways, parking, transit services, and signage on site and beyond related to construction and to visitation/tourism.
- **Duration:**
    - **Short-Term**—Impacts would be primarily associated with construction-related activities.
    - **Long-Term**—Impacts would be semi-permanent to permanent changes associated with roadways and transit systems.

5.12.1 Alternative 1—No Action Alternative

Analysis—During and after the bicentennial, visitors on summer weekends at FOCL would likely exceed the capacity of the existing parking lots and visitor center. This could result in vehicles circling the parking lot waiting for others to leave FOCL, or result in the visitor leaving the memorial. Without establishment of an ITS, visitors would have less information about road congestion prior to their arrival. In this alternative the proposed Lewis and Clark shuttle system would not connect to FOCL. The lack of a shuttle and/or Park-and-Ride facility will lead to a greater number of private vehicles crowding the roads and parking lots associated with FOCL. Congestion on the Young's Bay Bridge, which leads to FOCL and other regional attractions, would continue to get worse. Not implementing the RDUA would continue to limit bicycle and pedestrian access and safety at FOCL. Taking no action would result in a long-term, minor, adverse impact on transportation systems.

Cumulative Impacts—The regional road system would continue to experience congested conditions, due to increased numbers of tourists and local commuters. Development of the Lewis and Clark National Trail and Trailhead would construct some additional parking around FOCL, but this would not be enough to compensate with the increased number of private vehicles arriving at FOCL during the bicentennial. Without access to a Park-and-Ride facility fewer riders on the proposed Lewis and Clark shuttle system could likely be less than anticipated. This would result in a direct long-term, moderate, adverse impact to the regional transportation system. Any additional congestion on the area roadways would result in a short-term, moderate, adverse impact on regional transportation systems. Other future foreseeable

actions that would impact area roads include the proposed realignment of Business 101. This would alleviate some of the road congestion and improve safety near FOCL which, would result in a long-term, minor, beneficial impact. The impacts of the other actions in addition to Alternative 1 would result in cumulative impacts would be short- and long-term, moderate in intensity, and adverse to the transportation system in and around FOCL.

Conclusion—There would be a long-term, moderate adverse impact to FOCL and regional transportation systems.

5.12.2 Alternative 2—River Day Use Area/Airport Site

Analysis—Access to the RDUA would provide additional parking for visitors when overflow conditions require use of the area. This would require visitors drive past the entrance to FOCL, then wait for a shuttle to transport them to the visitor center. The number of potential vehicles that would utilize the RDUA would not be greater than the number of vehicles that would park at FOCL parking lot on a non-peak day and the RDUA would provide another option for visitors to park resulting in a short-term, moderate beneficial impact. Development of the RDUA would add canoe and other non-motorized access and improve bike and pedestrian connections, allowing visitors multiple ways to visit FOCL. The development of the RDUA site would have a long-term, minor, beneficial impact to the regional road system by providing multiple modes of transit to get to the park (FOCL shuttle, waterways, etc.) rather than just by automobile and relieve some congestion on the local roadways. The Park-and-Ride System would have a long-term, minor, beneficial impact on the area's road systems by alleviating some of the individual vehicle traffic on roads. Visitors driving to the Airport site could utilize the Park-and-Ride facility that would be shared with local commuters. The maximum capacity of a 500-car parking lot should offer adequate opportunities for visitors to find a space to park and catch the shuttle to FOCL. The potential capacity of the Park-and-Ride facility would provide minor, short- and long-term beneficial impacts to the regional transportation system by potentially removing a large number of vehicles from the roadways.

Cumulative Impacts—Development of the RDUA, taken in combination with the proposed fort to ocean trail and trailhead would provide additional parking at FOCL and alleviate congestion in the immediate vicinity of FOCL. The reasonably foreseeable expansion of SETD services, taken in conjunction with the development of this project, would have a long-term, moderate, beneficial impact on regional transit systems. Additional development in the vicinity of the airport, along with development of this project, could have a positive benefit increasing ridership on the Lewis and Clark shuttle. Other future foreseeable actions that would impact area roads include the proposed realignment of Business 101 and future development around the Astoria Airport and elsewhere in the region. The Business 101 realignment would alleviate some of the road congestion and improve safety near FOCL and have a long-term, minor, beneficial impact. Other foreseeable actions in the region in conjunction with FOCL's expansion and SETD's shuttle system could encourage multiple modes of transit to be used within the region resulting in cumulative impacts that would be short- and long-term, moderate in intensity, and beneficial to the transportation system in and around FOCL.

Conclusion—This alternative would have a short-term, negligible impact to the region from the construction of the proposed facilities. It would have a long-term, moderate, beneficial impact by providing another option for tourists to park their car and ride to the shuttle system to the fort and other regional attractions/special events.

5.12.3 Alternative 3—River Day Use Area/West County Site

Analysis—For an analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility refer to Alternative 2. Construction of the Park-and-Ride at the West County site may result in some short-term, minor delays in traffic on U.S. 101. However, the location of this alternative could be much easier for tourists to come from and access U.S. 101, which might make using this facility more convenient for visitors and commuters.

Cumulative Impacts—Cumulative impacts for the RDUA are the same as Alternative 2. The Park-and-Ride borders U.S. 101 and potential access—in the short-term—to the highway could be an issue. ODOT would have to approve new access to the highway, and currently there are no plans for road improvements to this corridor. A proposed access road connecting to the loop road through the North Coast Business Park would reduce the driving time to FOCL; however, there is a moratorium on connections to the internal loop road due to negotiations with the USACE. Driving time to FOCL from this site would vary depending on whether an internal road is constructed. There may be increased traffic around this site due to its proximity to other businesses that are not connected with FOCL activities. As development of the Business Park continues, the shuttle could be of greater use for commuter traffic that might take advantage of the proposed Lewis and Clark shuttle to get to and from work resulting in a long-term, minor, beneficial impact on the regional transit system. The ODOT proposal to realign Business 101 would cause minor delays in traffic and access to the Park-and Ride during construction resulting in a short-term, minor, adverse impact. However, once the realignment was completed this could be a long-term, minor benefit to the Park-and-Ride by creating a more direct connection between the business park, Business 101, and U.S. 101. The proposed realignment of Business 101 would eventually result in a new intersection of U.S. 101 and the Business Park bringing new traffic and visitors to the area that may lead to increased tourism from that site to FOCL. Other foreseeable actions in addition to this alternative would result in cumulative impacts that would be short- and long-term, moderate in intensity, and beneficial to the transportation system in and around FOCL.

Conclusion—This alternative—like Alternative 2—would have a long-term, moderate beneficial impact on the region by providing another option for tourists to park their car and ride the shuttle system to regional attractions and special events.

5.12.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The proposal for the RDUA in this alternative is similar to Alternative 2. This alternative differs from Alternatives 2 and 3 because it uses dispersed parking rather than the Park-and-Ride concept and places greater emphasis on the ITS and on the proposed Lewis and Clark shuttle. The dispersed parking would spread individual vehicle traffic around the communities surrounding FOCL casting a wider net of potential visitors who may choose to visit FOCL even if that were not their original intention. As a result, use of the ITS reservation system would be stressed this alternative more than in the other two. The dispersed parking concept would result in some FOCL visitors parking in lots at locations remote from the park. This would have a long-term, moderate, beneficial impact to the regional roadways by spreading traffic around the region while providing multiple ways to reach FOCL. However, if the 50 spaces that are proposed for use at the intermodal center by FOCL visitors are used early in the day by persons intending to spend an extended period of time in downtown Astoria, it might limit parking opportunities for other visitors that arrive later in the day. This type of constraint may also occur at other areas designated as dispersed parking sites and could result in a long-term, minor, adverse impact on the shuttle system. Visitors could be "captured" in

Astoria as well as other outlying parking areas in Seaside and in southwest Washington. The intermodal center is next to the Astoria Trolley, which provides access to many attractions, restaurants and shops along the Columbia River waterfront. The SETD link with FOCL would promote the use of mass transit services to area attractions rather than using individual vehicles. Implementation of this alternative would result in a short- and long-term, moderate beneficial impact to regional transportation systems.

Cumulative Impacts—Cumulative impacts related to the RDUA are similar to Alternative 2. The dispersed parking, and corresponding ITS and SETD partnership, would be useful beyond the bicentennial and could be incorporated into one of the many regional events. The proposed realignment of Business 101 would have a short-term, minor, adverse impact on regional transportation systems, but the resulting road and its improved connection to U.S. 101 could be incorporated into the Lewis and Clark shuttle system. There is the potential for additional development to occur, particularly near the airport and in the North Coast Business Park. Traffic patterns could be changed to accommodate this development and to take advantage of the Lewis and Clark shuttle providing visitors and commuters with a wider array of transportation opportunities. Additional development in combination with this alternative, could cause traffic delays resulting in a short-term, minor adverse impact on the Park-and-Ride system. Any minor adverse cumulative impacts associated with implementation of this alternative would be offset by the moderate beneficial impacts resulting from the actions proposed. Other foreseeable actions plus the preferred alternative would result in cumulative impacts that would be short- and long-term, moderate in intensity, and beneficial to the transportation system in and around FOCL.

Conclusion—This alternative would have a short- and long-term, moderate beneficial impact on the regional transit system.

5.13 Land Use/Zoning

Basis of Analysis—A principal feature of the GMP for FOCL proposes to add land area to the park for the protection of surrounding scenic and natural resources. A natural setting within and around the encampment site is an important component of the Lewis and Clark story. Development pressures in the region are negatively affecting the ability of FOCL to meet its mission of preserving the story of the Lewis and Clark expedition's winter encampment. The impact analysis is focused on encroaching land development and the potential for development of action alternatives within current land development controls.

Methodology—Impact analysis focused on direct impacts to FOCL from development and/or land use changes around FOCL to possible impacts to the regional community in general from potential development of the RDUA and the Fort Clatsop Park-and-Ride facility.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing development surrounding FOCL.
- **Minor**—Small changes in land use would occur primarily in areas directly related to FOCL visitation and tourism. Regional land use would remain basically unchanged from current conditions.
- **Moderate**—Noticeable changes would occur in some sectors of FOCL land use related to construction and to visitation/tourism. Regional land use would be somewhat modified.

- **Major**—Substantial changes would occur in some sectors of FOCL land use related to construction and to visitation/tourism. Regional land use would be noticeably modified.
- **Duration:**
  - **Short-Term**—Impacts would be primarily associated with construction-related activities.
  - **Long-Term**—Impacts would be associated with semi-permanent to permanent land use changes of FOCL

5.13.1 Alternative 1—No-Action Alternative

Analysis—This alternative would not have any effect on land use within FOCL, although it would result in less land within FOCL boundaries. The surrounding area is zoned as either agricultural forest or Exclusive Farmland Use (EFU), however this designation is subject to change if other areas surrounding the fort are developed in ways incompatible with FOCL's purpose. The area is zoned for timber harvest and/or agricultural uses could have a negative impact on the park. This alternative would result in short- and long-term minor, adverse impacts to FOCL by precluding additional land acquisition, which could result in resource degradation.

Cumulative Impacts—There would be an expansion of FOCL's holding as described in the GMP. This expansion would not develop any of the additional land other than what would be used for the fort to ocean trail. Past land uses associated with FOCL's planned boundary expansion have included logging activities. Future actions regarding land use at FOCL include the proposed Lewis and Clark Trail and trailhead. This would not modify the land use at FOCL, but would slightly expand the area designated for visitor use. Development would most likely occur near the Astoria Airport and the North Coast Business Park, but this would have a negligible impact on land use and zoning in the surrounding region. Cumulative impacts of other actions plus the No-Action Alternative would result in short- and long-term, minor in intensity, and adverse to the land uses in and around FOCL.

Conclusion—The No-Action Alternative would result in a long-term, minor adverse impact on FOCL. It would have a negligible impact on the surrounding area.

5.13.2 Alternative 2—River Day Use Area/Airport Site

Analysis—The RDUA would extend the visitor carrying capacity of FOCL, resulting in a long-term, moderate, beneficial impact to FOCL. The development of day use facilities, such as picnic areas and watercraft landing, would have a long-term, moderate, beneficial impact to FOCL. Such development would further the interpretive mission of the park, and the protection of resources, while providing a wider array of options for visitors to spend their time at FOCL. The development of the RDUA site would have a short-term, negligible adverse impact on nearby residential during the construction phase, but would have a long-term, minor, beneficial impact by providing local residents and tourists additional recreational opportunities in and around FOCL. The Astoria Airport Park-and-Ride site is bordered to the north and east by industrial, commercial facilities, and the landside facilities of the Astoria Airport. The Park-and-Ride site would be developed on area that is currently open space but slated for future development. The airport has been in existence for decades and there has been previous development at the proposed Park-and-Ride facility location. This alternative would result in short- and long-term, moderate beneficial impacts.

Cumulative Impacts—Past development at the RDUA site included logging activities that adversely impacted the area. Development of the RDUA as described in this alternative would clean up and reuse the former logging site for visitor day use activities. This would result in a long-term, moderate, benefit to FOCL. The RDUA, in conjunction with the proposed Lewis and Clark Trail, would expand the area designated for visitor use at FOCL. The increase in facilities and area available for visitor use would have a long-term, moderate beneficial impact on land use and visitor experience at FOCL. Foreseeable future actions in the area surrounding the airport Park-and-Ride site is slated for industrial and/or commercial development, which is compatible with airport development. Other future foreseeable actions include further development in the surrounding region. Development would most likely occur at the North Coast Business Park, but this would have a negligible impact on land use and zoning in the area directly adjacent to FOCL. The proposed expansion of FOCL's borders would help to minimize the effects of any encroaching development. Other actions such as FOCL boundary expansion plus Alternative 2 would result in cumulative impacts that would be short- and long-term, minor in intensity, and beneficial.

Conclusion—This alternative would have a long-term, moderate beneficial impact on FOCL by expanding its boundary, protecting the area around FOCL, and providing alternative land uses for visitor recreation purposes.

5.13.3 Alternative 3—River Day Use Area/West County Site

Analysis—For an analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility refer to Alternative 2. The west county site is the least disturbed of all action alternatives. This alternative would not substantially change the land use designation of the Business Park; the Park-and-Ride facility would be compatible with proposed development in the Business Park. The existing mix of commercial, office, and industrial land uses along U.S. 101 would not be impacted by the construction or operation of the Park-and Ride. This alternative would result in a short-term, minor, adverse impact during the construction of the Park-and-Ride, but long-term impacts would be minor and beneficial.

Cumulative Impacts—Past development at the RDUA site included logging activities that adversely impacted the area. Development of the RDUA as described in this alternative would clean up and reuse the former logging site. This would result in a long-term, moderate, beneficial impacts. The RDUA, in conjunction with the proposed fort to ocean trail, would expand the area designated for visitor use at FOCL providing additional area for visitor dispersal. Other future foreseeable actions include significant further development in the surrounding region. Development would most likely occur near the Astoria Airport and the North Coast Business Park, but this would have a negligible impact on land use and zoning in the area directly adjacent to FOCL. The proposed expansion of FOCL's borders would help to minimize the effects of any encroaching development. Cumulative impacts from foreseeable future actions plus implementation of this alternative would result in short- and long-term, minor in intensity, and beneficial to the land uses in and around FOCL.

Conclusion—The RDUA would also have a long-term, moderate beneficial impact on FOCL by expanding its boundary and protecting the area around FOCL. The development of the Park-and-Ride would result in impacts that would be long-term, minor, and beneficial impact.

5.13.3 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—The proposal for the RDUA in this alternative is similar to Alternative 2. The dispersed parking in this alternative uses existing parking facilities for automobiles. Possible parking spaces include the intermodal center in downtown Astoria, the Astoria high school, and in downtown Seaside. The dispersed parking sites would not impact the existing mix of commercial, office, and industrial land uses along U.S. 101 and U.S. 30. This alternative would result in a long-term, minor, beneficial change in land use at FOCL, but would have a negligible impact on land use in the surrounding region.

Cumulative Impacts—Past development at the RDUA site included logging activities that adversely impacted the area. Development of the RDUA as described in this alternative would clean up and reuse the former logging site and would result in a long-term, moderate, beneficial impacts. The RDUA, in conjunction with the proposed boundary expansion and Lewis and Clark Trail, would expand the area designated for visitor use at FOCL. The increase in facilities and area available for visitor use and dispersal, which could improve visitor experience and would have a long-term, moderate beneficial impact on land use at FOCL. The dispersed parking option in this alternative would have a long-term, moderate, beneficial impact to the surrounding community because it utilizes existing areas and would not need any adjustment to current land use. Other future foreseeable actions include significant further development in the surrounding region. Development would most likely occur near the Astoria Airport and the North Coast Business Park, but this would have a negligible impact on land use and zoning in the area directly adjacent to FOCL. The proposed expansion of FOCL's borders would help to minimize the effects of any encroaching development. The combination of the proposed development in the region and the development of the RDUA and expansion of FOCL would have a long-term, minor, beneficial impact on land use designation. Cumulative impacts would be short- and long-term, minor in intensity, and beneficial to the land uses in and around FOCL.

Conclusion—This alternative would also have a long-term, moderate beneficial impact to FOCL by expanding its boundary and protecting the area around FOCL.

5.14 Visual/Scenic Resources

Basis of Analysis—A principal feature of the GMP for FOCL proposes to add land area to the park for the protection of a natural setting within and around the encampment site. The basis for analysis is a qualitative interpretation of what each alternative might mean in terms of potential changes to FOCL viewsheds of the Lewis and Clark River valley from current conditions. The impacts on staff and/or visitor experience related to visual resources at each potential alternative site will be discussed.

Methodology—Impact analysis focused on direct impacts to FOCL viewsheds of the Lewis and Clark River valley from construction and long-term operation of potential development of the RDUA and the Fort Clatsop Park-and-Ride facility.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing viewshed conditions surrounding FOCL.
- **Minor**—Small changes in the viewshed would occur primarily in areas directly related to FOCL.

- **Moderate**—Noticeable changes would occur in some areas within the Lewis and Clark River valley of the viewshed.
- **Major**—Substantial changes would occur in some areas within the Lewis and Clark River valley of the viewshed related to construction and long-term operation of the facility.
- **Duration:**

  - **Short-Term**—Impacts would be primarily associated with construction-related activities.
  - **Long-Term**—Impacts would be semi-permanent to permanent changes in the Lewis and Clark River valley.

5.14.1 Alternative 1—No-Action Alternative

Analysis—Taking no action would result in a continuation of visitors using the main road to FOCL and parking at the visitor center. There would be no substantial change in appearance of the arrival to FOCL or where visitors would be received. FOCL's acquisition of 70 acres of land from FCHA would protect viewsheds from both sides of the Lewis and Clark River. The No-Action Alternative would result in a long-term, minor adverse impact on FOCL viewsheds along the Lewis and Clark River by precluding the acquisition of land along the river.

Cumulative Impacts—While the acquisition of additional acreage from the proposed boundary expansion would have a long-term, beneficial impact to FOCL, encroaching development and/or continued timber harvesting in the region would continue to compromise the natural setting along the Lewis and Clark River valley. Future foreseeable development, particularly near the Astoria Airport and the Business Park could adversely impact the view as visitors are arriving to FOCL if that development is not compatible with the FOCL's setting. The combination of regional timber harvesting and development in the immediate vicinity of FOCL would have a long-term, minor, adverse, impact on viewsheds at FOCL, however, FOCL's proposed expansion to 1,088 acres will minimize this impact. Cumulative impacts would be long-term, minor in intensity, and adverse to the viewsheds at FOCL.

Conclusion—The No-Action Alternative would have a long-term, minor, adverse impact on viewsheds on the periphery of the memorial.

Impairment—There would be no impairment of FOCL's resources or values in this alternative.

5.14.2 Alternative 2—River Day Use Area/Airport Site

Analysis—The RDUA would provide visitors access to the natural and cultural environment that was an integral component of the Lewis and Clark story. The RDUA would result in expansion of FOCL by developing approximately 11 of the 70 acres acquired from FCHA along the west bank of the Lewis and Clark River, south of the current FOCL boundary. The land on the east side of the river is undeveloped and provides a glimpse into the natural resource conditions along the river 200 years ago. This land expansion would provide and protect viewsheds along both sides of the river resulting in short- and long-term, minor beneficial impacts.

With the exception of several industrial properties on Airport Road, the drive to FOCL from the airport could provide a good scenic transition into the story of the winter encampment. The SETD shuttle system would give FOCL staff an opportunity to highlight the natural views of

the rural landscape between the airport and FOCL, and relate them to the story of Lewis and Clark.

Cumulative Impacts—Other foreseeable actions at FOCL include resource protection that could include resource management efforts to restore the vegetation along the river to more closely resemble the natural scene at the time of the encampment, which would provide visitors a better understanding of the landscape that the Lewis and Clark expedition experienced. The expansion of FOCL and the development of the RDUA would have a long-term, moderate, beneficial impact on the viewsheds of the area. In the past the RDUA site was used for logging and this alternative would restore the site to its former conditions. Development of the RDUA site in conjunction with the proposed Lewis and Clark Trail would allow visitors to see more of the regional landscape while surrounded by native vegetation and wetlands that characterized the land during the Lewis and Clark winter encampment.

Other foreseeable future actions that could impact the viewshed surrounding FOCL include a continuation of logging activities in the nearby area and the possibility of encroaching development, particularly in the area around the Astoria airport and the Business Park. This alternative would minimize the effects of encroaching land on viewsheds in the immediate vicinity of FOCL. Other foreseeable actions in addition to this alternative would result in short- and long-term cumulative impacts that are minor in intensity and beneficial.

Conclusion—This alternative would have a long-term minor benefit to FOCL's viewsheds.

Impairment—There would be no impairment of FOCL's resources or values in this alternative.

5.14.3 Alternative 3—River Day Use Site/West County Site

Analysis—For an analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility refer to Alternative 2. The West County site has more open space surrounding it than either the airport site or the dispersed parking alternatives. The views from the Park-and-Ride could provide a scenic transition into FOCL. The SETD shuttle system would give FOCL staff an opportunity to highlight the natural views of the rural landscape between the West County site and FOCL, and relate them to the story of the Lewis and Clark expedition. This alternative would result in impacts that are minor in intensity, short- to long-term and beneficial.

Cumulative Impacts—The cumulative impacts for the RDUA would be similar to those described in Alternative 2. The combination of regional timber harvesting and development in the immediate vicinity of FOCL would have a long-term, minor, adverse, impact on viewsheds, however, FOCL's proposed expansion to 1,088 acres will somewhat minimize this impact.

Other foreseeable actions include the potential that build out of the Business Park could disrupt natural views and block viewsheds to the north and east resulting in a long-term, minor, adverse of the landscape surrounding FOCL. Once the road construction was completed there may be an opportunity for visitors using the scenic by-way to use the Park-and-Ride to further explore the region. This alternative would minimize the effects of encroaching development on viewsheds in the immediate vicinity of FOCL. Although regional development may have long-term adverse impacts, the combination of FOCL's expanded borders and utilization of the U.S. 101 scenic by-way would result in cumulative impacts that would be short- and long-term, minor in intensity and beneficial to the viewsheds at FOCL.

Conclusion—This alternative would have a long-term, moderate beneficial impact to FOCL.

Impairment—There would be no impairment of FOCL resources or values in this alternative.

5.14.4 Alternative 4—River Day Use Site/Dispersed Parking

Analysis—The proposal for the RDUA in this alternative is similar to Alternative 2 and 3. There would be a short term, minor, adverse impact on visual resources during the construction of the RDUA. The dispersed parking would allow visitors to enter the park from several directions-each providing a different scenic landscape from the surrounding area. This alternative would result in short- and long-term, minor beneficial impacts.

Cumulative Impacts—The cumulative impacts for the RDUA would be similar to those described in Alternative 2 and 3. This alternative would minimize the effects of encroaching land on viewsheds in the immediate vicinity of FOCL. The combination of future foreseeable actions, such as area development and in addition to the proposed action would result in cumulative impacts that would be short- and long-term, minor in intensity and beneficial to the viewsheds at FOCL.

Conclusion—There would be an overall long-term, minor, beneficial impact to the park from development of this site.

Impairment—There would be no impairment of FOCL's resources in this alternative.

5.15 Infrastructure

Basis of Analysis—Infrastructure development in some communities has not kept up with regional growth and utility service is not constant throughout the area. The capacities of regional utility service providers and proximity to utility infrastructure will be discussed.

Methodology—Impact analysis focused on direct impacts to the local infrastructure from construction and long-term operation from potential development of the RDUA and the Fort Clatsop Park-and-Ride facility.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing conditions in infrastructure.
- **Minor**—Small changes in infrastructure would occur primarily in areas directly related to FOCL.
- **Moderate**—Noticeable changes would occur in infrastructure related to construction and to visitation/tourism.
- **Major**—Substantial changes would occur in infrastructure related to construction and to visitation/tourism.
- **Duration:**
    - **Short-Term**—Impacts would be primarily associated with construction-related activities.

- **Long-Term**—Impacts would be associated with semi-permanent to permanent changes in infrastructure.

5.15.1 Alternative 1—No-Action Alternative

Analysis—The No-Action Alternative would maintain FOCL's existing water lines in the Young's River/Lewis and Clark Water System, and their sewer services. FOCL utility service and local infrastructure would change only on the part of the local communities. This alternative would have a long-term, minor, adverse impact on FOCL infrastructure and a negligible impact on infrastructure in the surrounding community.

Cumulative Impacts—Foreseeable future actions including FOCL's planned expansion and Lewis and Clark Trailhead construction and a current water system that requires upgrading, result in the need to expand potable water lines to FOCL's infrastructure. Increased visitation could put a greater strain on these lines and the ability of the park to keep up with visitor needs. This would have a long-term, minor, adverse impact on FOCL. Increased visitation and no upgraded facilities would have a short-term, minor, adverse impact the region's infrastructure. Future development in the region, particularly near the Astoria airport and the North Coast Business Park may be adversely impacted in the short-term by the city of Warrenton's moratorium of wastewater line tap-ins, but would have a negligible impact on FOCL. The combination of past utility lines, future actions, and this alternative would result in negligible cumulative impacts.

Conclusion—The No-Action Alternative would result in a long-term, negligible adverse impact to FOCL.

5.15.2 Alternative 2—River Day Use Area/Airport Site

Analysis—There is additional potable water capacity available to the RDUA, but sanitary sewer is not currently available. It is likely that construction of the proposed RDUA and Park-and-Ride facility would require on-site septic. Development of the RDUA site would include vault toilets for visitor comfort. Construction of on-site septic would have a short-term, minor, adverse impact at FOCL. However, the presence of on-site vault toilets would have a long-term, minor, beneficial impact on visitor experience. Although there are utilities across the street from the Astoria Airport site, local infrastructure providers for this service area do not have the treatment capacity to handle more input and have put a moratorium on new tap-ins to the water and sanitary sewer system.

Cumulative Impacts—Potential increases in the number of tourists visiting the area could overwhelm FOCL's and the region's infrastructure, but an improvement in utilities at the RDUA and Trailhead sites should minimize any adverse impacts caused by a strain on FOCL's utilities. The improvement of utilities at the RDUA and Trailhead would have a long-term, minor benefit to FOCL staff and visitors. As development occurs at the airport site, there may be a long-term need for on-site septic. The city moratorium on new tap-ins may continue for the next few years, and would ultimately have a short-term, minor, adverse impact on the proposed development. However, the City of Astoria and the ODEQ plan to increase the capacity of the local sewer system by 2008. This could have a long-term, minor, beneficial impact on the airport Park-and-Ride site if a need developed to put in an on-site septic system. Other future foreseeable actions that may impact infrastructure include additional development at the airport and in the surrounding region. Future development would put a strain on the infrastructure in

the surrounding region, but would have a negligible impact on FOCL's infrastructure. Cumulative impacts associated with this alternative in conjunction with the other, aforementioned future actions would result in short- and long-term, minor, beneficial impacts.

Conclusion—There would be a long-term, minor, beneficial impact to adding on-site vault toilets the RDUA. The long-term impact of this alternative on the Park-and-Ride, and the surrounding region's infrastructure would be negligible.

5.15.3 Alternative 3—River Day Use Area/West County Site

Analysis—For an analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility refer to Alternative 2. There are utilities (water distribution) in the immediate vicinity of West County site, however, local infrastructure providers for this service area do not have the treatment capacity to handle more input and have put a moratorium on new tap-ins to sanitary sewer systems. Construction of the proposed Park-and-Ride facility would require vault toilets. However, the presence of on-site vault toilets would have a long-term, minor, beneficial impact on visitor experience. The impacts from this alternative would be negligible.

Cumulative Impacts—The cumulative impacts for the RDUA would be similar to those described in Alternative 2. Within this alternative the proposed expansion of FOCL, including development of the Lewis and Clark Trail and trailhead, would also occur. As build out of the Business Park occurs there may be a short-term need for on-site septic systems. Other future foreseeable actions that may impact infrastructure include additional development at the airport and in the surrounding region. Future development could put a strain on the infrastructure in the surrounding region, but would have a negligible impact on FOCL's infrastructure. Implementation of this alternative would result in a short-term, minor, adverse impact on FOCL and regional infrastructure during the construction of the on-site septic systems. Any minor adverse cumulative impacts associated with implementation of this alternative would be short term and would be offset by the long-term, minor, beneficial impacts resulting an increase in sanitary sewer capacity at the city of Warrenton. Cumulative impacts of this alternative taken in conjunction with other future foreseeable actions would be short- and long-term, minor, and beneficial to FOCL's infrastructure, but have a minor, adverse impact on infrastructure in the surrounding region.

Conclusion—This alternative would result in negligible impacts on to regional infrastructure resources.

5.15.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—For an analysis of the proposed RDUA and the basic program for the Fort Clatsop Park-and-Ride facility refer to Alternative 2. Construction of on-site septic would have a short-term, minor, adverse impact at the RDUA and FOCL. However, the presence of on-site vault toilets would have a long-term, minor, beneficial impact on visitor experience. The dispersed parking in this Alternative would place visitors within close proximity to utilities in the surrounding commercial districts. No further upgrading of utilities are currently proposed for this alternative. This alternative would result in a long-term, minor, beneficial impact on FOCL's infrastructure. It would have a negligible impact on infrastructure in the surrounding region.

Cumulative Impacts—The cumulative impacts for the RDUA would be similar to those described in Alternative 2. Within this alternative the proposed expansion of FOCL, including development of the Lewis and Clark Trail and trailhead, would also occur. This expansion in conjunction with development of the RDUA would have a long-term, minor, benefit to FOCL. Using the dispersed sites may have a short-term, minor, beneficial impact on regional infrastructure by spreading out the visitors who would use the local utilities instead of concentrating them at one site only. However, if parking in these locations continue to rise, particularly on peek weekends, minimal facilities may be required. Other future foreseeable actions that may impact infrastructure include additional development at the airport and in the surrounding region. Future development could put a strain on the infrastructure in the surrounding region, but would have a negligible impact on FOCL's infrastructure. Cumulative impacts resulting from this alternative along with other future foreseeable actions would be short-term, minor in intensity and adverse during the construction of the on-site septic systems at the RDUA, however this would be mitigated by a long-term, minor, benefit to visitor experience once those facilities are in place.

Conclusion—This alternative would result in a negligible effects on infrastructure resources.

5.16 Air Quality

Basis of Analysis—Increases in the number of visitors driving to FOCL and the region could result in increases in air pollution. The basis of analysis is the potential for increases in air pollutants and disturbance to visitors at FOCL by occasional emissions from buses.

Methodology—Impact analysis focused on potential increases in air pollutants in the region and at FOCL. The potential impacts of the visitor center parking lot, in both the short- and long-term, action alternatives and other non-NPS actions are considered.

Intensity, Duration, and Type of Impact:

- **Negligible**—There would be no noticeable change from the existing conditions in terms of air pollutants.
- **Minor**—Small changes in air pollutants would occur in the region and areas directly related to FOCL.
- **Moderate**—Noticeable changes in air quality in the region and at the fort.
- **Major**—Substantial changes in air pollutants would be measurable regionally and noticeable at the fort.
- **Duration:**
    - **Short-Term**—Impacts would be primarily associated with the visitor parking lot, construction-related activities and increases in vehicles in the region during the bicentennial, through the year 2006.
    - **Long-Term**—Impacts would be semi-permanent to permanent changes associated with vehicle parking at FOCL and increases in vehicles on the regional roads, beyond the year 2006.

5.16.1 Alternative 1—No Action Alternative

Analysis—Taking no action would result in continued parking in the FOCL visitor center parking lot, which could result in occasional disturbances to visitors by emissions from idling buses and automobiles. This impact would result from congested conditions in the parking lot and would typically be limited the visitor center area and to periods when buses are parked near the visitor center. Emissions from idling buses and automobiles in the visitor center parking lot would create short duration, but long-term, minor adverse impacts to localized air quality. No construction activity would occur resulting in negligible impacts to local air quality.

Cumulative Impacts—Other foreseeable actions that might impact localized air quality at FOCL include construction of the trailhead for the trail from the fort to the ocean. Construction impacts could include airborne particulates, and emissions from construction equipment. These impacts would be short term, minor in intensity and adverse. These potential impacts would only occur for as long as construction extends. The cumulative intensity of trailhead development impacts could be increased by potential construction at the North Coast Business Park and at Astoria Airport. Impacts would be short-term, minor adverse impacts to localized air quality if all projects were implemented simultaneously. Impacts to regional air quality from short-term increases in airborne particulates and vehicle emissions would be negligible. Although there would likely be an increase in traffic related to tourism and development of the business park and airport, coastal winds would disperse air pollutants resulting in a short- and long-term negligible impact to regional air quality. Cumulative impacts from this alternative in addition to other foreseeable actions on localized air quality would be short- and long-term, minor in intensity and adverse. Cumulative impacts on regional air quality would be negligible.

Conclusion—This alternative would result in short- and long-term, minor adverse impacts to air quality at FOCL during peak periods, however there would be negligible impacts to regional air quality.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.16.2 Alternative 2—River Day Use Area/Astoria Airport

Analysis—Visitor parking would not be allowed during the bicentennial or on peak days following the bicentennial. Prohibiting parking at the visitor center would eliminate sources of localized air pollutants including particulates and the host of chemical emissions from vehicles. Disturbances to visitors would be minimized by eliminating vehicle emissions during the bicentennial and during peak weekends following the bicentennial. This alternative would result in short- and long-term, minor beneficial impacts to localized air quality at FOCL. Construction impacts at the RDUA would include localized airborne particulates, and emissions from construction vehicles, however it is unlikely that any air pollutants would be noticeable at the fort. Construction impacts at the airport would be similar to those at the RDUA, although the intensity level would be slightly greater due to the larger area to be developed. Impacts to localized air quality from construction of the RDUA and Park-and-Ride facility would be short-term, minor in intensity and adverse. Impacts to regional air quality would be negligible. Development of a regional transit shuttle facility could result in fewer automobiles traveling on regional roads. Fewer miles traveled in the region by tourists and local commuters may result in less congestion and vehicle emissions. Impacts from this alternative would be short- and long-term, minor and beneficial to regional air quality.

Cumulative Impacts—Other foreseeable actions that might impact localized air quality at FOCL include construction of the trailhead for the trail from the fort to the ocean. Construction impacts could include airborne particulates and emissions from construction equipment. These impacts would be short term, minor in intensity, and adverse. These potential impacts would only occur for as long as construction extends. The cumulative intensity of trailhead development and construction of the RDUA could be increased by potential construction at the North Coast Business Park, development of industrial or commercial buildings at the Astoria Airport, and the proposed Park-and-Ride facility also at the airport. Impacts would be short-term, minor adverse impacts to localized air quality if all projects were implemented simultaneously. Impacts to regional air quality from short-term increases in airborne particulates and vehicle emissions would be negligible. Although there would likely be an increase in traffic related to tourism and development of the business park and airport, coastal winds would disperse air pollutants resulting in a short- and long-term negligible impact to regional air quality. Development of a transit shuttle stop may also provide local commuters an another option to get to work, as well as provide tourists the opportunity to utilize mass transit to access regional tourist attractions. Cumulative impacts from this alternative, in addition to other foreseeable actions on localized air quality, would be short- and long-term, minor in intensity, and adverse. Cumulative impacts on regional air quality could be short- and long-term, minor and beneficial.

Conclusion—This alternative would result in short term, minor adverse impacts to localized air quality and short- and long-term, minor beneficial impacts regional air quality.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.16.3 Alternative 3—River Day Use Area/West County Site

Analysis—Refer to Alternative 2 for a discussion of impacts related to the RDUA. Construction impacts at the west county site would be similar to those at the RDUA, although the intensity level would be slightly greater due to the larger area to be developed. Impacts to localized air quality from construction of the RDUA and Park-and-Ride facility would be short-term, minor in intensity, and adverse. Impacts to regional air quality would be negligible. Development of the regional transit shuttle facility, particularly with the location right on U.S. 101, would result in fewer automobiles traveling on regional roads. Fewer miles traveled in the region by tourists and local commuters may result in reduced congestion and vehicle emissions. Impacts from this alternative would be short- and long-term, minor, and beneficial to regional air quality.

Cumulative Impacts—Cumulative impacts for this alternative would be the same as Alternative 2. Refer to Alternative 2 for a detailed discussion of the RDUA. Cumulative impacts from this alternative in addition to other foreseeable actions on localized air quality would be short- and long-term, minor in intensity, and adverse. Cumulative impacts on regional air quality could be short- and long-term, minor, beneficial.

Conclusion—This alternative would result in short term, minor adverse impacts to localized air quality and short- and long-term, minor beneficial impacts regional air quality.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.16.4 Alternative 4—River Day Use Area/Dispersed Parking

Analysis—This alternative would have similar impacts related to the RDUA as in Alternative 2 and 3. Refer to Alternative 2 for a discussion of impacts related to the RDUA. Utilizing dispersed parking facilities could result in fewer automobiles traveling on regional roads. This alternative could result in fewer miles traveled in the region by tourists than any other alternative because the dispersed parking areas are spread throughout the region. Capturing travelers farther out on regional highways may result in less congestion and vehicle emissions. This alternative may not be as attractive to local commuters as the regional transit shuttle facility proposed in Alternatives 2 and 3; however, impacts from this alternative would be short- and long-term, minor and beneficial to regional air quality.

Cumulative Impacts—Cumulative impacts for this alternative would be similar to Alternatives 2 and 3. Refer to Alternative 2 for a detailed discussion of potential impacts. Cumulative impacts from this alternative, in addition to other foreseeable actions on localized air quality, would be short-term, minor in intensity and adverse. Cumulative impacts on regional air quality could be short- and long-term, minor beneficial.

Conclusion—This alternative would result in short term, minor, adverse impacts to localized air quality and short- and long-term, minor, beneficial impacts regional air quality.

Impairment—There would be no impairment of FOCL resources or values from this alternative.

5.17 Impacts to Cultural Resources

Basis of Analysis—The basis of the analysis was to detect the presence/absence of cultural resources in each APE in accordance with federal law, and to evaluate the potential for direct or indirect affects to significant cultural resources by each action alternative.

Methodology—The Area of Potential Effect (APE) was determined for each action Alternative (Wilson, et al. 2002). The APE relative to each action alternative is as follows:

- **Alternative 2**—The total 11 acres of the River Day Use Area, a 10-foot wide 0.87-mile long corridor between the River Day Use Area and the historic canoe landing (Pedestrian Connection), and a 13-acre area south of the Port of Astoria Airport (Airport Site).
- **Alternative 3**—The total 11 acres of the River Day Use Area, a 10-foot wide 0.87-mile long corridor between the River Day Use Area and the historic canoe landing (Pedestrian Connection), and a 12-acre site located just west of U.S. 101 (West County Site).
- **Alternative 4**—The total 11 acres of the River Day Use Area, a 10-foot wide 0.87-mile long corridor between the River Day Use Area and the historic canoe landing (Pedestrian Connection), dispersed parking at existing regional SETD transit locations, Astoria High School, and the Astoria Airport.

Wilson et al. (2002) conducted archival research at the Oregon State Historic Preservation Office, literature searches of previous cultural resource surveys in the area, a review of the Clatsop County Comprehensive Plan, and an examination of General Land Office maps and corresponding tract book entries prior to fieldwork.

A three-person archaeological crew conducted a pedestrian survey within each APE between April 9 and 11, 2002 (Wilson et al. 2002). Within the River Day Use Area (RDUA), the West County Site, and the Port of Astoria Site the crew established transects at 20-meter (65-foot) intervals throughout each survey block. Along the trail between the RDUA and the canoe landing, the crew established a single transect, at the center of the 3-meter (10-foot) wide APE. Shovel test probes (STP), staggered at 20-meter (65-foot) intervals along each transect, were used to gather horizontal information, although the crew typically did not excavate probes in areas of disturbance (i.e., existing roads, logged areas, filled areas, etc.) or inundation. Within these areas, the crew conducted a surface inspection, maintaining 20-meter transect intervals, and excavated a sample of shovel tests to document the geomorphology.

The shovel probes typically measured 40 cm in diameter, no more than 80 cm deep, and were excavated in arbitrary 10-cm levels. Excavated material was dry-screened through ¼-inch hardware mesh, and crewmembers returned screened materials to the shovel test after recordation. Documentation of the shovel probes included stratum color, texture, features, inclusions, disturbances, and cultural material. The crew members took photographs throughout the Project Area, depicting the differing vegetation and topography.

Preservation of the Prehistoric and Historic Cultural Resources—The impact analysis is discussed in terms of avoidance of any direct or indirect impacts to cultural resources.

5.17.1 Alternative 1—No-Action Alternative

Analysis—The No-Action Alternative would not disturb any additional areas in or around Fort Clatsop since no construction of additional parking and other visitor use facilities would be involved.

Cumulative Impacts—Archeological resources at FOCL are subject to damage form development, vandalism, visitor access, and natural processes. Past development in the park resulted in the disturbance and loss of some archeological resources during excavation and construction activities. Many of the reasonable foreseeable future actions at the park, such as construction of the fort to ocean trail and associated trailheads, could also disturb archeological resources. Other reasonable foreseeable actions include realignment of Business 101, and additional development at Astoria Airport, which could disturb archeological resources. If significant archeological resources could not be avoided, the data they possess regarding prehistoric and/or historic lifeways would be documented and recovered, in consultation with the state historic preservation office. The impacts to such archeological resources would be adverse and range in intensity from minor to major, depending upon both the scope of the potential actions and the significance of the resources affected. Because this alternative would not impact any known archeological resources, it would not contribute to the impacts of other past, present, and reasonably foreseeable future actions. Therefore, there would be no construction related cumulative impacts to archeological resources resulting from the preferred alternative.

Conclusion—The No-Action Alternative would have a negligible impact on cultural resources in and around Fort Clatsop National Monument.

Impairment—There would be no impairment of FOCL's resources or values in this alternative.

5.17.2 Alternative 2—River Day Use Area/Airport Site

Analysis—The River Day Use Area was previously used as a log transfer location and portions of the site contains fill material. The entire 11-acre area is covered with asphalt or gravel and is highly compacted. The first 1700 feet of the Pedestrian Connection extending north from the RDUA is located along a portion of a dike measuring between 3 and 10 feet high and 10-15 feet wide. This was the location of a county road until about 1960 (Wilson et al., 2002). The remaining 1800 feet of the Pedestrian Connection is largely an inundated wetland area along the Lewis and Clark River. Surface inspections and limited shovel testing of these highly disturbed sites revealed no cultural resources in the RDUA. The Airport Site is the former site of the Astoria Naval Air Station, which was demolished in the 1960s and 1970s. The area contains piles of concrete and asphalt, and there are blade gouges and other evidence of heavy equipment use throughout the area. Surface inspection and limited shovel testing revealed no cultural resources.

Cumulative Impacts—Archeological resources at FOCL are subject to damage form development, vandalism, visitor access, and natural processes. Past development in the park resulted in the disturbance and loss of some archeological resources during excavation and construction activities. Many of the reasonable foreseeable future actions at the park, such as construction of the fort to ocean trail and associated trailheads, could also disturb archeological resources. Other reasonable foreseeable actions include realignment of Business 101, and additional development at Astoria Airport, which could disturb archeological resources. If significant archeological resources could not be avoided, the data they possess regarding prehistoric and/or historic lifeways would be documented and recovered, in consultation with the state historic preservation office. The impacts to such archeological resources would be adverse and range in intensity from minor to major, depending upon both the scope of the potential actions and the significance of the resources affected. Because this alternative would not impact any known archeological resources, it would not contribute to the impacts of other past, present, and reasonably foreseeable future actions. Therefore, there would be no construction related cumulative impacts to archeological resources resulting from the preferred alternative.

Conclusion—Alternative 2 would have a negligible impact on cultural resources.

Impairment—There would be no impairment of FOCL's resources or values in this alternative.

5.17.3 Alternative 3—River Day Use Area/West County Site

Analysis—Examination of the RDUA and its associated APE was identical to that described for Alternative 2. The West County Site has been clear cut of trees and is characterized by slash piles and extensive undergrowth. Surface inspections at 20-meter transect intervals in the east half of the area and visual inspections as possible around slash piles in the west half of the area revealed no cultural resources. A 1976 archaeological study of a portion of the West County Site associated with U.S. 101 construction also failed to reveal the presence of any cultural resources at this site.

Cumulative Impacts—Archeological resources at FOCL are subject to damage form development, vandalism, visitor access, and natural processes. Past development in the park resulted in the disturbance and loss of some archeological resources during excavation and construction activities. Many of the reasonable foreseeable future actions at the park, such as construction of the fort to ocean trail and associated trailheads, could also disturb archeological

resources. Other reasonable foreseeable actions include realignment of Business 101, and additional development at Astoria Airport, which could disturb archeological resources. If significant archeological resources could not be avoided, the data they possess regarding prehistoric and/or historic lifeways would be documented and recovered, in consultation with the state historic preservation office. The impacts to such archeological resources would be adverse and range in intensity from minor to major, depending upon both the scope of the potential actions and the significance of the resources affected. Because this alternative would not impact any known archeological resources, it would not contribute to the impacts of other past, present, and reasonably foreseeable future actions. Therefore, there would be no construction related cumulative impacts to archeological resources resulting from the preferred alternative.

Conclusion—Alternative 3 would have a negligible impact on cultural resources.

Impairment—There would be no impairment of FOCL's resources or values from this alternative.

5.17.4 Alternative 4—River Day Use Area/Dispersed Parking (Preferred Alternative)

Analysis—As discussed for Alternatives 2 and 3, the RDUA does not present a concern regarding cultural resources. The SETD transit system parking areas along with the parking lot at Astoria High School also would not be of concern since these are existing paved areas that would not be modified as part of this alternative. This proposed overflow bus parking area at Astoria Airport is paved and near the airport hangars and terminal. This is not the same area of the airport as examined for Alternative 1.

Cumulative Impacts—Archeological resources at FOCL are subject to damage form development, vandalism, visitor access, and natural processes. Past development in the park resulted in the disturbance and loss of some archeological resources during excavation and construction activities. Many of the reasonable foreseeable future actions at the park, such as construction of the fort to ocean trail and associated trailheads, could also disturb archeological resources. Other reasonable foreseeable actions include realignment of Business 101, and additional development at Astoria Airport, which could disturb archeological resources. If significant archeological resources could not be avoided, the data they possess regarding prehistoric and/or historic lifeways would be documented and recovered, in consultation with the state historic preservation office. The impacts to such archeological resources would be adverse and range in intensity from minor to major, depending upon both the scope of the potential actions and the significance of the resources affected. Because the preferred alternative would not impact any known archeological resources, it would not contribute to the impacts of other past, present, and reasonably foreseeable future actions. Therefore, there would be no construction related cumulative impacts to archeological resources resulting from the preferred alternative.

Conclusion—Alternative 4 would have a negligible impact on cultural resources.

Impairment—There would be no impairment of FOCL's resources or values from this alternative.

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7.0 LIST OF PREPARERS

7.1 Core Planning and Design Team

7.1.1 NPS

- Don Striker—Superintendent, Fort Clatsop N.M. (FOCL)
- Scott Stonum—Chief of Resources, FOCL
- Nancy Eid—Resource Specialist, FOCL
- Curt Ahola—Resource Specialist FOCL
- Jan Burton—Job Captain, Denver Service Center (DSC)
- Patrick Shea—Project Manager, DSC

7.1.2 FHWA

- Peter Field—Transportation Planner, Federal Highway Administration (FHWA)
- Jody Marshall—Compliance Specialist, FHWA
- Dick Gatten—Project Manager

7.1.3 Consultants

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- Dave Dister—Natural Resource Specialist, Woolpert LLP
- Martha Alarie—Planner, Woolpert LLP
- Jerry Adamson—Landscape Architect, HNTB
- Dennis Strah—Vice President/Landscape Architect, HNTB
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7.2.1 NPS

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- Gary Smillie—Floodplains Specialist, Water Resource Division, WASO

7.2.2 Consultants

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- Brian Elrod—Landscape Architect, HNTB
- Scott Chapman—Transportation Planner, Nelson Nygaard
- Bo Sun—Landscape Architect, HNTB
- Rick Strawn—Architect, HNTB

7.2.3 Community Stakeholders and Other Cooperating Entities

- Cindy Howe—Sunset Empire Transit District
- Mitch Mitchum—City of Astoria
- Lylla Gaebel—City of Warrenton
- Ron Larsen—Port of Astoria
- Don McDaniel—Port of Astoria
- Mark Morgans—Weyerhauser Co.

8.0 CONSULTATION AND COORDINATION

A planning and design workshop was conducted at Fort Clatsop National Memorial November 5 through 9, 2001. The week-long planning and design workshop was conducted to analyze site conditions, identify and discuss issues, and develop conceptual site plans for potential alternatives. Participants in the planning and design workshop included representatives from:

- Sunset Empire Transit District
- Port of Astoria
- City of Warrenton
- City of Astoria
- NPS Denver Service Center
- Fort Clatsop National Memorial staff
- NPS Columbia Cascades Support office
- Federal Highway Administration
- Weyerhauser

On November 6, 2001 the National Park Service mailed a press release to local and regional media to announce the date for a public scoping meeting. The press release gave the date, time and location for the public scoping meeting. Notification was also sent to numerous individuals throughout the community about the public scoping meeting. The public scoping meeting was held at the Shilo Inn in Warrenton, Oregon on November 6, 2001. A total of 11 people attended the meeting. The issues identified during the public scoping meeting are incorporated into the Section 2.4: Issues and Concerns of this EA. On Friday November 9, 2001 another meeting was conducted to present conceptual designs for the River Day Use Area and the Park-and-Ride facilities. Additional ideas for revisions to the conceptual designs were discussed.

On June 15, 2001 the National Park Service sent a letter to the U.S. Fish and Wildlife Service to initiate consultation and request information concerning any federally listed threatened or endangered species near Fort Clatsop National Memorial. A letter received from the U.S. Fish and Wildlife Service on July 16, 2001 notified the National Park Service of a variety of species that may occur in the project area. On March 12, 2002, the National Park Service sent another letter to the U.S. Fish and Wildlife Service to continue consultation and request an updated species list. The National Park Service received a response letter on June 12, 2002. The National Park Service will submit a copy of this document to the U.S. Fish and Wildlife Service and ask for concurrence on the determinations of effects presented in Section 5.3: Impacts on Ecological Resources in the EA.

On March 12, 2002 the National Park Service sent a letter to the Oregon State Historic Preservation Officer. The National Park Service will submit a copy of this document to the Oregon State Historic Preservation Officer for concurrence on determination of effects presented in Section 5.8: Impacts to Cultural Resources.

Additional consultation included:

- Chinook Tribe
- National Marine Fisheries Service
- Oregon Department of Environmental Quality
- U.S. Army Corps of Engineers, Portland District
- Oregon Department of Fish and Wildlife
- Oregon Department of Transportation

On March 20, 2002 a series of on-site meetings were conducted at Fort Clatsop National Memorial. The intent of the meetings was to acquaint representatives of regulatory agencies with the alternative site locations and issues associated with each of the sites. The following agencies were represented at the meetings:

- Clatsop County
- Port of Astoria
- Federal Highway Commission
- Oregon Department of Transportation
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Oregon Department of Fish and Wildlife
- Sunset Empire Transit District

Agencies and organizations that will receive a copy of the EA include:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Oregon Department of Fish and Wildlife
- Oregon State Historic Preservation Officer
- Oregon Department of Transportation
- Oregon Department of Environmental Quality
- Oregon Department of Land Conservation and Development
- Chinook Tribe
- Clatsop County
- City of Astoria
- City of Warrenton
- Port of Astoria
- Federal Highway Commission
- Sunset Empire Transit District

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 S.E. 98th Avenue, Suite 100
Portland, Oregon 97266
(503) 231-6179 FAX: (503) 231-6195

Reply To: 8330.4561(02)
File Name: Sp456.wpd
TR Number: 02-4049

June 12, 2002

Scott Stonum
U.S. National Park Service
92343 Fort Clatsop Road
Astoria, OR 97103

Subject: Lewis and Clark Bicentennial Alternative Transportation Project
USFWS Reference # (1-7-02-SP-456)

Dear Mr. Stonum:

This is in response to your letter, dated March 12, 2002, requesting updated information on listed and proposed endangered and threatened species that may be present within the area of the Lewis and Clark Bicentennial Alternative Transportation Project (1-7-01-SP-895), in Clatsop County. The U.S. Fish and Wildlife Service (Service) received your correspondence on March 15, 2002.

We have attached a list (Attachment A) of threatened and endangered species that may occur within the area of the Lewis and Clark Bicentennial Alternative Transportation Project. The list fulfills the requirement of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). National Park Service (NPS) requirements under the Act are outlined in Attachment B.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems on which they depend may be conserved. Under section 7(a)(1) and 7(a)(2) of the Act and pursuant to 50 CFR 402 *et seq.*, NPS is required to utilize their authorities to carry out programs which further species conservation and to determine whether projects may affect threatened and endangered species, and/or critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) which are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (NEPA) (42 U.S.C. 4332 (2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to the Biological Assessment be prepared to determine whether they may affect listed and proposed species. Recommended contents of a Biological Assessment are described in Attachment B, as well as 50 CFR 401.12.

If NPS determines, based on the Biological Assessment or evaluation, that threatened and endangered species and/or critical habitat may be affected by the project, NPS is required to consult with the Service following the requirements of 50 CFR 402 which implement the Act.

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Attachment A includes a list of candidate species under review for listing. The list reflects changes to the candidate species list published October 30, 2001, in the Federal Register (Vol. 66, No. 210, 54808) and the addition of "species of concern." Candidate species have no protection under the Act but are included for consideration as it is possible candidates could be listed prior to project completion. Species of concern are those taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

If a proposed project may affect only candidate species or species of concern, NPS is not required to perform a Biological Assessment or evaluation or consult with the Service. However, the Service recommends addressing potential impacts to these species in order to prevent future conflicts. Therefore, if early evaluation of the project indicates that it is likely to adversely impact a candidate species or species of concern, NPS may wish to request technical assistance from this office.

Your interest in endangered species is appreciated. The Service encourages NPS to investigate opportunities for incorporating conservation of threatened and endangered species into project planning processes as a means of complying with the Act. If you have questions regarding your responsibilities under the Act, please contact Stacy Sroufe at (503) 231-6179. All correspondence should include the above referenced file number. For questions regarding salmon and steelhead, please contact National Marine Fisheries Service, 525 NE Oregon Street, Suite 500, Portland, Oregon 97232, (503) 230-5400.

Sincerely,

Kemper M. McMaster
State Supervisor

Attachments
1-7-02-SP-456

cc: OFWO-ES
ODFW (nongame)

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Birds	
Band-tailed Pigeon	*Columba fasciata*
Olive-sided flycatcher	*Contopus cooperi (=borealis)*
Mountain quail	*Oreortyx pictus*
Purple martin	*Progne subis*
Amphibians and Reptiles	
Tailed frog	*Ascaphus truei*
Northern red-legged frog	*Rana aurora aurora*
Fish	
Green sturgeon	*Acipenser medirostris*
River lamprey	*Lampetra ayresi*
Pacific lamprey	*Lampetra tridentata*
Plants	
Frigid shootingstar	*Dodecatheon austrofrigidum*
Queen-of-the-forest	*Filipendula occidentalis*
Moss	*Limbella fryei*

(E) - Listed Endangered *(T) - Listed Threatened* *(CH) - Critical Habitat has been designated for this species*
(PE) - Proposed Endangered *(PT) - Proposed Threatened* *(PCH) - Critical Habitat has been proposed for this species*

Species of Concern - Taxa whose conservation status is of concern to the Service (many previously known as Category 2 candidates), but for which further information is still needed.

(CF) - Candidate: National Marine Fisheries Service designation for any species being considered by the Secretary for listing for endangered or threatened species, but not yet the subject of a proposed rule.

*** Consultation with National Marine Fisheries Service may be required.*

 # U. S. Department of Interior, Fish and Wildlife Service, October 31, 2000, Endangered and Threatened Wildlife and Plants, 50 CFR 17.11 and 17.12

& Federal Register Vol. 60, No. 133, July 12, 1995 - Final Rule - Bald Eagle

¥ Federal Register Vol. 64, No. 57, March 25, 1999, Final Rule - Columbia River Chum Salmon

£ Federal Register Vol. 64, No. 56, March 24, 1999, Final Rule - West Coast Chinook Salmon

¥ Federal Register Vol. 62, No. 87, May 6, 1997, Final Rule-Coho Salmon

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APPENDIX A

BIOLOGICAL ASSESSMENT

APPENDIX A—BIOLOGICAL ASSESSMENT

A.1 Background

This Biological Assessment (BA) was developed in accordance with Section 7 (c)(1) of the Endangered Species Act. This subsection requires Federal agencies to request information of the Secretary as to whether any species listed or proposed for listing might be present in the area of the proposed action. If the Secretary advises, based on the best scientific and commercial data available, that such species may be present, the requesting agency shall conduct a biological assessment for the purpose of identifying any endangered species or threatened species which is likely to be affected by the proposed action.

For the subject project, documents relevant to the identified potentially affected species were reviewed for baseline information and life history requirements. Additional information was obtained by the Ft. Clatsop Resources Program Manager and other staff biologists through on-site observations and surveys (survey results are provided in the attachments). Impact analyses were based on several factors: the known or likely occurrence of a species or its habitat in the proposed project vicinity; direct physical loss of habitat; effective loss of habitat resulting from avoidance or abandonment due to construction activity or noise, and species sensitivity to human disturbance.

A.2 Defining Impact Areas

Alternative 4 in the Environmental Assessment is the preferred alternative and describes the proposed action. This alternative involves development within a portion of the River Day-Use Area – a strip of land totaling approximately 15 acres in size along the west side of the Lewis and Clark River immediately south of the Ft Clatsop National Monument boundary. This portion of the River Day-Use Area (RDUA) is bordered on the west by Ft Clatsop Road and on the south by private property. Much of the RDUA on the west side of the river has been disturbed by historic use as a log transfer facility. There are an additional 55 acres of undeveloped land included in the RDUA on the east side of the Lewis and Clark River. However, this portion of the RDUA would not be involved in the proposed action.

The physical boundaries of the RDUA described above for the west side of the river were used as the boundaries for the purposes of the biological assessment. Because of the disturbed nature of the RDUA itself and because of various levels of human disturbance on all sides of the RDUA, no buffers zones were included in the BA. Alternative 4 also includes the use of other existing dispersed parking areas within the region. These parking areas would include the intermodal transit center in downtown Astoria, parking lots in Seaside, and, for special events, the Astoria High School parking lot. These are all existing parking facilities that will remain unchanged, and, as such, were not addressed in the BA.

Although not selected as the preferred alternative and not part of the proposed action, two other remote sites were also examined as part of the BA process. These sites were the Astoria Airport Site and the West County Site. The airport site is a partially paved area on the south portion of the airport and would, if fully developed in cooperation with Sunset Empire Transit District (SETD), involve disturbance of approximately 13 acres of highly to moderately disturbed old field area. The West County Site is a completely logged over site approximately 12 acres in size located on the west side of the North Coast Business Park. U.S. 101 forms the western boundary of the site.

A.3 Findings

Specific species and habitat information presented below for Ft Clatsop (including the RDUA) was developed by the Ft. Clatsop resources management staff, and documentation supporting much of the following information can be found on file in the Resource Management office.

Direct effects as described in this report refer to mortality or disturbance that results in flushing, displacement, harassment for the animal, or removal of a plant species. Indirect effects refer to modification of habitat and/or effects to prey species.

A.4 Federally Listed Species (from USFWS Project Area Species List Obtained and Dated June 12, 2002, with Reference #1-7-02-SP-456)

- **Columbian White-Tailed Deer**—This deer is Federally listed as Endangered, historic records have reported white-tailed deer as far west as Astoria in the Columbia River drainage. Anecdotal reports of whitetails in the vicinity of Astoria are received periodically by refuge biologists at the Columbian White-tailed Deer National Wildlife Refuge, but none are confirmed. USFWS surveys have documented Columbian whitetail deer occurrence only as far west as Karlson Island in the Lewis and Clark Islands National Wildlife Refuge, approximately ten miles east of Astoria.

    - **Information Sources**—Clark, Al. Refuge Manager, Columbian White-tailed Deer NWR [(360) 795-3915]; and Verts, B. J. and Carraway, Leslie N. *Land Mammals of Oregon*. Berkeley: University of California Press, 1998.
    - **Direct Effects**—None. Not present in or near project area.
    - **Indirect Effects**—None.

- **Marbled Murrelet**—Federally listed as Threatened, marbled murrelets have hot been surveyed for or confirmed to occur within Fort Clatsop NM, although suitable mature Sitka spruce-western hemlock maritime forest nest habitat exists within the park. They have been noted within the vicinity of the park.

    - **Information Source**—Oregon Breeding Bird Atlas, 1995-1999.
    - **Direct Effects**—Species is not known or expected to occur in or near the project area, therefore no Direct Effects are expected to occur.
    - **Indirect Effects**—A high percentage of the vegetation associated with the project site is made up of red alder and is not considered suitable murrelet habitat. The few coniferous trees present will be retained as habitat trees.

- **Bald Eagle**—Federally listed as Threatened, bald eagles are year-round residents in the Columbia River estuary and are regularly observed along the Lewis and Clark River within and near Fort Clatsop NM. An established nest is located in UTM zone 10 at 5108250mN/ 433040mE, which is one half mile away from the proposed River Day Use Area separated by the Lewis and Clark river and a large dense band of trees to the west. An aerial survey on 4/2/2002 confirmed a pair of eagles incubating eggs on this nest. This site has successfully produced one to two fledglings each year since 1998. All three proposed transportation sites are within bald eagle flight habitat. The River Day Use area and the proposed trail area at the south end of the park are also within regular feeding and perching habitat for the birds on the Lewis and Clark River, and both areas are within one half mile of the established nest noted above. There are no mature conifer nesting habitat at any of the

sites. Potential roost trees exist on both banks of the Lewis and Clark River, all of which will be retained.

- **Information Source**—Isaacs, Frank. Oregon Cooperative Wildlife Research Institute [(541) 929-7154].
- **Direct Effects**—About half of the project area is just at one half mile distance from an active nest site. A large band of trees along the river corridor precludes line of site to the nest. It is possible that during construction some disturbance could occur if any eagles were roosting or perched in or around the project area, however visual or noise disturbance are not anticipated to the nest site due to the distance and vegetative screening. As stated in the 1986 Pacific Bald Eagle Recovery Plan, pp 52-53, disturbance distances for nest sites are ¼ mile for sound and ½ mile line of site. Neither of these disturbance criteria will be violated.
- **Indirect Effects**—No potential roost or nest trees will be disturbed by the project construction or operations. Long-term improvements to riparian vegetation may enhance eagle habitat within the project area.

- **Chum Salmon (Lower Columbia River)**—Federally listed as Threatened, chum salmon have been confirmed downriver and north of the project area in Youngs Bay (1990) and in the Youngs River near Wireless Road (2002). The West County and Airport sites do not contain anadromous fish habitat, but the River Day Use Area and proposed riverside trail within the park are directly adjacent to habitat for anadromous species.

  - **Direct Effects**—Any and all work occurring over or within anadromous fish waters will only be conducted in permitted timeframes to avoid any direct effects to salmonids that my be in the vicinity.
  - **Indirect Effects**—Potential increased run-off into the Lewis and Clark River from the project site will be addressed in the project design to minimize this potential indirect effect. On-site detention and water quality requirements will be addresses in accordance with the governing jurisdictional requirements. Storm water run-off will be collected on-site, detained and released at the required historic flows back into the river. The detention areas will also provide for water quality. To satisfy detention and water quality issues, existing wetlands and proposed detention basins may both be considered in design solutions. Depending on the final design solution, multiple detention and water quality areas may be utilized to satisfy the jurisdictional requirements and to bring additional enhancements to the site.

- **Chinook Salmon (Lower Columbia River)**—Chinook salmon are a Federally listed Threatened species. Their presence in the Lewis and Clark River was confirmed in Oregon Department of Fish and Wildlife survey data between 1948-1996, but none have been recorded in ODFW surveys of the river since that time. On 4/11/2002 one Chinook smolt was seined in RM1 of Hansen Creek (north of the park) during a fish presence survey by salmonid biology students at Astoria High School. The West County and Airport sites do not contain anadromous fish habitat, but the River Day Use Area and proposed riverside trail within the park are directly adjacent to habitat for anadromous species.

  - **Information Sources**—Cain, Lee. Astoria High School Salmonid Biology Class Fish Presence Survey, 4/11/2002; and Oregon Department of Fish and Wildlife. Peak Spawning Ground Counts of Fall Chinook in Tributaries of Youngs Bay, 1948-97.
  - **Direct Effects**—Any and all work occurring over or within anadromous fish waters will only be conducted in permitted timeframes to avoid any direct effects to salmonids that my be in the vicinity. Potential increased run-off into the Lewis and Clark River

from the project site will be addressed in the project design to minimize this potential indirect effect. On-site detention and water quality requirements will be addresses in accordance with the governing jurisdictional requirements. Storm water run-off will be collected on-site, detained and released at the required historic flows back into the river. The detention areas will also provide for water quality. To satisfy detention and water quality issues, existing wetlands and proposed detention basins may both be considered in design solutions. Depending on the final design solution, multiple detention and water quality areas may be utilized to satisfy the jurisdictional requirements and to bring additional enhancements to the site.

- **Indirect Effects**—Potential increased run-off into the Lewis and Clark River from the project site will be addressed in the project design to minimize this potential indirect effect. On-site detention and water quality requirements will be addresses in accordance with the governing jurisdictional requirements. Storm water run-off will be collected on-site, detained and released at the required historic flows back into the river. The detention areas will also provide for water quality. To satisfy detention and water quality issues, existing wetlands and proposed detention basins may both be considered in design solutions. Depending on the final design solution, multiple detention and water quality areas may be utilized to satisfy the jurisdictional requirements and to bring additional enhancements to the site.

- **Oregon Silverspot Butterfly**—This butterfly is Federally listed as Threatened. On the Clatsop Plains in Clatsop County, Oregon, the Oregon silverspot butterfly occupies early successional coastal grasslands containing its host plant, the early blue violet (*Viola adunca*), nectar sources and adult courtship areas. Its historic population center on the plains is approximately 8 kilometers (5 miles) long and 1.6 kilometers (1 mile) wide, extending from Camp Rilea on the north to the Gearhart Golf Course on the south. The Oregon silverspot population on Clatsop Plains has declined in recent years' surveys, with only a single adult documented in 1998, near Camp Rilea, previously the species' population stronghold within the county. The West County site is approximately one mile east of the northeastern extent of the butterfly's range on Clatsop Plains. The vegetation cover is regenerating upland forest and contains no suitable coastal grassland habitat. The Airport and River Day Use Area sites are approximately 2.5 miles east of Clatsop Plains and contain no coastal grassland habitat.

  - **Information Sources**—U.S. Fish and Wildlife Service. 2001. Oregon silverspot butterfly (*Speyeria zerene hippolyta*) revised recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon; and VanBuskirk, R. 1998. Survey for the presence of the Oregon Silverspot Butterfly, *Speyeria zerene hippolyta* (Lepidoptera, Nymphalidae) on the Clatsop Plains in 1998. University of California. The Nature Conservancy, Portland, Oregon.
  - **Direct Effects**—No individuals or habitat present at the project location. None
  - **Indirect Effects**—None.

- **Howellia**—This Federally listed Threatened aquatic plant occurs in ponds and lakes in Clackamas, Marion and Multnomah Counties in Oregon's Willamette Valley, and also in Washington, California, Idaho and Montana. The species has never been documented in Clatsop County. None of the three proposed sites contain palustrine habitat suitable for this species.

  - **Information Sources**—Hitchcock, C. Leo and Cronquist, Arthur. *Flora of the Pacific Northwest.* Seattle: University of Washington Press, 1973; and Maxwell, Cathy L.

Vascular Flora of the Willapa Hills and Lower Columbia River Area of Southwest Washington. Douglasia Occasional Papers, Vol. 4, 1991.

A.5 Oregon Natural Heritage Program, 2001. Rare, Threatened, and Endangered Plants and Animals of Oregon; Oregon Natural Heritage Program, Portland, Oregon

A.5.1 Plant References

- Sayce, Kathleen. Columbia Coast Vascular Plants: Pacific and Wahkiakum Counties, Washington and Clatsop County, Oregon. Nahcotta, Wash.: Shoalwater Botanical, 2001.
- Thomas, Duncan W. The Vascular Flora of the Columbia River Estuary. The Wasmann Journal of Biology 42 (1-2), 1984, pp. 92-106.
- No State-listed plant species within areas of the proposed action or alternatives.

A.5.2 Proposed Species

- **Coastal Cutthroat (Columbia River)**—A Federally proposed Threatened Species, cutthroat trout were documented on 2/6/2002 within RM1 of Alder Creek in the southern area of Fort Clatsop NM. The creek at the southern boundary of the park, within the area of proposed development, has not been surveyed for anadromous fish. The West County and Airport sites do not contain anadromous fish habitat, but the River Day Use Area and proposed riverside trail within the park are directly adjacent to habitat for anadromous species.

  - **Information Source**—FOCL Fish Survey data, 2/2002.
  - **Effects**—Refer to Chum and Chinooks Salmon above.

A.5.3 Candidate Species

- **Coho Salmon (Lower Columbia River)**—Candidate species, the presence of this Candidate species has been confirmed in tributary streams of the Lewis and Clark River in recent Oregon Department of Fish and Wildlife fish count data. A February 2002 fish survey of Fort Clatsop streams found juvenile coho in RM2 of Hansen Creek and RM1 of Alder Creek within the park. A 4/11/2002 fish survey in RM1 of Hansen Creek (just north of the park) netted 7 juvenile coho. The West County and Airport sites do not contain anadromous fish habitat, but the River Day Use Area and proposed riverside trail within the park are directly adjacent to habitat for anadromous species.

  - **Information Sources**—Cain, Lee. Astoria High School Salmonid Biology Class Fish Presence Survey, 4/11/2002; FOCL Fish Survey data, 2/2002; and Oregon Department of Fish and Wildlife. Supplemental Coho Spawning Ground Survey Peak Fish Counts, 1990-1992.
  - **Effects**—Refer to Chum and Chinook Salmon above.

A.5.4 Species of Concern

- **Voles**—The white-footed vole was historically documented within Fort Clatsop NM in 1940, but has not been found in more recent park small mammal surveys (1993, 2001). This species is most frequently found in riparian (especially alder) habitat within coniferous forests. Small clearings with forb growth may also provide important habitat. Red tree voles are found along the coast in Sitka spruce forests that contain some Douglas fir, since their diet consists almost exclusively of its needles, and to a lesser extent those of western hemlock, spruce and fir. The River Day Use Area and proposed trail area in the south area of the park were included in a 2001 small mammal survey. Neither vole species was found during the survey. The Airport site doesn't contain forested habitat required by these voles. It is unknown whether the regenerating mixed forest at the West County site provides suitable habitat.

    - **Information Sources**—Csuti, Blair [et al.] *Atlas of Oregon Wildlife: distribution, habitat and natural history*. Corvallis: Oregon State University Press, 1997; Ek, David. A Selection of Rare Wildlife Species, or Species of Concern, within Clatsop County, Oregon. NPS: FOCL, 2/1997; and Museum of Vertebrate Zoology. Mammals from Accn. 6310 (Clatsop Co., Oregon) in MVZ Collections, 7/95.
    - **Direct Effects**—None expected due to absence of individuals at the site.
    - **Indirect Effects**—Minimal loss of potential habitat at the preferred site. Removal of exotic weed species and replacement with native plant species may improve habitat for this species over time.

- **Bats**—Fringed, long-legged and Yuma myotis were mist-netted in coniferous forest habitat near the Fort Clatsop replica during 1995 surveys. Vouchers of these three species were obtained during an earlier 1940 mammal survey of the site. A park mammal survey in 2001 netted a single long-eared myotis at Clay Pit Pond. Pacific big-eared bats have not been found within Fort Clatsop NM. A 1958 Clatsop County record reports a Cannon Beach collection location for the species. West of the Oregon Cascades, the bats are associated with moderate to older coniferous forests. They are reported to be very intolerant of human disturbance. Silver-haired bats have not been found within the park. These bats occur throughout Oregon except most areas of the Columbia Basin. Their primary habitat is older Douglas fir/western hemlock forests with riparian forage areas. All three proposed transportation sites provide feeding habitat, but the River Day Use Area and proposed trail area in the park have the highest quality feeding habitat as well as suitable roosting trees, which are not present at the other two sites.

    - **Information Sources**—Csuti, Blair [et al.] *Atlas of Oregon Wildlife: distribution, habitat and natural history*. Corvallis: Oregon State University Press, 1997; Ek, David. A Selection of Rare Wildlife Species, or Species of Concern, within Clatsop County, Oregon. NPS: FOCL, 2/1997; Mammals from Accn. 6310 (Clatsop County, Oregon) in MVZ Collections, 7/95; Petterson, Jim. Fort Clatsop Small Mammal Inventory, 2001. NPS: MORA, 3/2002; and Verts, B. J. and Carraway, Leslie N. *Land Mammals of Oregon*. Berkeley: University of California Press, 1998.
    - **Direct Effects**—Some alder trees may be removed within the project site and if occupied at the time could result in directly effecting individual bats. No coniferous trees will be removed.
    - **Indirect Effects**—Removal of some potential low-quality roosting habitat (alder) and other vegetation that could host prey species. Creation of detention basins and restoration of native plants could improve prey habitat over time.

- **Band-Tailed Pigeon**—Band-tailed pigeons are present throughout the Columbia River estuary, including within Fort Clatsop NM, although it is not known if they nest in the park's coniferous forests. It is somewhat difficult to confirm breeding of band-tailed pigeons, but the Oregon Breeding Bird Atlas notes they probably nest in the Fort Clatsop vicinity. The West County and Airport sites probably don't provide good feeding, nesting or roosting habitat for the pigeons, but the northern end of the River Day Use Area and the southern proposed trail area within the park have areas of suitable habitat and are adjacent to larger contiguous mature coniferous forests.

    - **Information Sources**—Ek, David. Birds at Fort Clatsop National Memorial, 4/12/1999; and Oregon Breeding Bird Atlas, 1995-1999.
    - **Direct Effects**—Individuals, if present, could be flushed from the area during construction and/or operation of the shuttle parking.
    - **Indirect Effects**—Should be minimal to none. No mature coniferous trees will be removed and very little disturbance will occur in the forested habitat.

- **Olive-Sided Flycatcher**—Olive-sided flycatchers are summer residents in coniferous forests of the Columbia River estuary, but have not been surveyed for or documented within Fort Clatsop NM. They are most frequently found in open coniferous forests with tall snags for perching. It is difficult to confirm nesting for this species.

    - **Information Sources**—Columbia River Estuary Study Taskforce. Birds of the Columbia River Estuary. 1984; and Oregon Breeding Bird Atlas, 1995-1999.
    - **Direct Effects**—Individuals, if present, could be flushed from the area during construction and/or operation of the shuttle parking.
    - **Indirect Effects**—Should be minimal to none. No mature coniferous trees will be removed and very little disturbance will occur in the forested habitat.

- **Purple Martin**—Purple martin are summer residents in the Columbia River estuary, but have not been surveyed for or documented within Fort Clatsop NM. They primarily feed in riparian habitats, with most area birds nesting in constructed boxes.

    - **Information Sources**—Columbia River Estuary Study Taskforce. Birds of the Columbia River Estuary. 1984; and Oregon Breeding Bird Atlas, 1995-1999.
    - **Direct Effects**—Individuals, if present, could be flushed from the area during construction and/or operation of the shuttle parking.
    - **Indirect Effects**—Should be minimal to none. No mature coniferous trees will be removed and very little disturbance will occur in the forested habitat.

- **Northern Red-Legged Frog**—Numerous observation and voucher records document the occurrence of northern red-legged frogs in Fort Clatsop's forest and riparian habitats. All three proposed development sites have portions of wetland habitat and it is probable all sites have populations of red-legged frogs that will be impacted by changes to the sites. The areas most vulnerable to development in terms of loss of amphibian habitat are the River Day Use Area and the southern proposed trail area within the park.

    - **Information Source**—Ek, David. A Selection of Rare Wildlife Species, or Species of Concern, within Clatsop County, Oregon. NPS: FOCL, 2/1997.
    - **Direct Effects**—Direct effects are not anticipated due to the fact that all riparian areas will be avoided. Individual frogs that may be on the roadway or in the upland construction areas could be directly effected by being run over or trampled.

- **Indirect Effects**—There will be no loss of wetland habitat associated with this project. New water detention areas and wetland swales will be created for retaining and treating run-off that could over time add positive benefits to amphibian habitat.

- **Green Sturgeon**—Green sturgeon occur in mixing and seawater salinity zones within the Columbia River estuary, but no records document them in the Lewis and Clark River. The West County and Airport sites provide no habitat for the fish.

  - **Information Source**—Bottom, Daniel L., Jones, Kim K., Herring, Margaret J. 1984. Fishes of the Columbia River Estuary: Final Report on the Fish Work Unit of the Columbia River Estuary Data Development Program. Dept. of Fish and Wildlife Research and Development, Corvallis, Oregon.
  - **Effects**—Refer to Chum and Chinook Salmon above.

- **River Lamprey**—River lamprey have not been confirmed to exist in streams within Fort Clatsop NM, although a 2/2002 fish survey of Hansen Creek netted a juvenile lamprey of unknown identity. The West County and Airport sites contain no stream habitat for lamprey, but Alder Creek within Fort Clatsop and the stream at the park's south boundary are potential habitat, as well as the Lewis and Clark River adjacent to the River Day Use Area.

  - **Information Sources**—Bottom, Daniel L., Jones, Kim K., Herring, Margaret J. 1984. Fishes of the Columbia River Estuary: Final Report on the Fish Work Unit of the Columbia River Estuary Data Development Program. Dept. of Fish and Wildlife Research and Development, Corvallis, Oregon; and FOCL Fish Survey, Hansen Creek, 2/2002.
  - **Effects**—Refer to Chum and Chinook Salmon above.

- **Pacific Lamprey**—Pacific lamprey have been found in Youngs Bay, but have not been confirmed in streams within Fort Clatsop NM, although a 2/2002 fish survey of Hansen Creek netted a juvenile lamprey of unknown identity. The West County and Airport sites contain no stream habitat for lamprey, but Alder Creek within Fort Clatsop and the stream at the park's south boundary are potential habitat, as well as the Lewis and Clark River adjacent to the River Day Use Area.

  - **Information Sources**—Bottom, Daniel L., Jones, Kim K., Herring, Margaret J. 1984. Fishes of the Columbia River Estuary: Final Report on the Fish Work Unit of the Columbia River Estuary Data Development Program. Dept. of Fish and Wildlife Research and Development, Corvallis, Oregon. FOCL Fish Survey, Hansen Creek, 2/2002.
  - **Effects**—Refer to Chum and Chinook Salmon above.

- **Additional Species**—The following animal and plant species have not been documented to occur within the project area: streaked horned lark, mountain quail, tailed frog, frigid shootingstar, queen-of-the-forest, and the moss species Limbella fryei.

- **Determinations for each Federally Listed Species:**

  - **Columbian White-Tailed Deer**—No individuals or habitat present in or near the project area, therefore the determination is **no effect**.

- **Marbled Murrelet**—No individuals or habitat present in or near the project area, therefore the determination is **no effect**.
- **Bald Eagle**—The project site is outside of the mandatory disturbance distances indicated in the 1986 Pacific Bald Eagle Recovery Plan. Some flushing or minor disturbance could occur if individual eagles are roosting or feeding within the general vicinity of the project area. The documented active nest that is 1/2 mile east of the project site is also in the direct flight path of the Astoria airport which present a constant noise and visual presence to the eagles occupying the nest. This coupled with farming activities and active roadways nearby indicate a high level of tolerance by these birds. The determination of the possible effects of this project are **may effect, not likely to adversely effect**.
- **Chum Salmon and Chinook Salmon**—All required and available measures will be implemented to mitigate potential increased run-off from the project site that could increase sediment flow into the Lewis and Clark River. Existing storm flow containment features and engineered wetlands will be utilized to catch and store run-off from the site. Construction of boardwalks associated with the trail connecting the parking lot to the park complex will be conducted only during time periods permitted by the appropriate agencies responsible for salmonid conservation. Any potential effects should be minimal in scope and duration. Lon-term stabilization and improvement of this site compared to it's current existing degraded condition should improve riparian and aquatic condition at and downstream of this site. The determination of the possible effects of this project on all salmonid species are **may effect, not likely to adversely effect**.
- **Oregon Silverspot Butterfly**—Neither individuals nor habitat are known or expected to occur in or near the project area, therefore determination of effects are **no effect**.
- **Howellia**—Neither individuals nor habitat are known or expected to occur in or near the project area, therefore determination of effects are **no effect**.

ATTACHMENTS

FORT CLATSOP NATIONAL MEMORIAL, DRAFT PLANT SPECIES LIST 7/3/2001, RDUA SITE: T7N R10W S1 AND T8N R10W S36 (RIVER DAY-USE AREA), SURVEY DATES: 3/20/2001, 4/24/2001, 4/10/2002

Ferns and Fern Allies

Athyrium filix-femina	lady fern
Blechnum spicant	deer fern
Dryopteris austriaca	wood fern
Equisetum telmateia	giant horsetail
Polypodium glycyrrhiza	licorice fern
Polystichum munitum	sword fern
Pteridium aquilinum	bracken

Gymnosperms

Picea sitchensis	Sitka spruce
Thuja plicata	western redcedar
Tsuga heterophylla	western hemlock

Angiosperms

Achillea millefolium	yarrow
Alnus rubra	red alder
Anaphalis margaritacea	pearly everlasting
Angelica genuflexa	kneeling angelica
Angelica lucida	seacoast angelica
Aster sp.	aster
Callitriche stagnalis	pond waterstarwort
Cardamine angulata	angled bittercress
Cardamine oligosperma	few-seeded bittercress
Carex deweyana	Dewey's sedge
Carex lyngbyei	Lyngby's sedge
Carex obnupta	slough sedge
Cerastium sp.	chickweed
Chrysanthemum leucanthemum	oxeye daisy
Cirsium vulgare	bull thistle
Claytonia sibirica	candyflower
Convolvulus sepium	morning glory
Cytisus scoparius	Scotch broom
Deschampsia caespitosa	tufted hair grass
Digitalis purpurea	foxglove
Disporum smithii	fairy lantern
Epilobium sp.	willowherb
Erechtites minima	coast burnweed
Festuca arundinacea	tall fescue
Galium aparine	cleavers
Gaultheria shallon	salal
Hedera helix	English ivy
Heracleum lanatum	cow parsnip

Angiosperms (Continued)

Holcus lanatus	common velvet grass
Hypochaeris radicata	hairy catsear
Ilex aquifolium	English holly
Impatiens sp.	jewelweed
Iris pseudacorus	yellow iris
Juncus sp.	rush
Laurus nobilis	laurel
Lilaeopsis occidentalis	lilaeopsis
Lonicera involucrata	twinberry honeysuckle
Lonicera sp.	honeysuckle
Lotus corniculatus	birdsfoot trefoil
Lotus purshiana	Spanish clover
Lupinus rivularis	streambank lupine
Lysichiton americanum	skunk cabbage
Maianthemum dilatatum	false lily-of-the-valley
Malus fusca	Oregon crabapple
Myosotis discolor	changing forget-me-not
Narcissus sp.	daffodil
Oenanthe sarmentosa	water parsley
Parentucellia viscosa	parentucellia
Phalaris arundinacea	reed canarygrass
Plantago lanceolata	narrowleaf plantain
Polypodium glycyrrhiza	licorice fern
Potamogeton sp.	pondweed
Potentilla anserina pacifica	Pacific silverweed
Ranunculus repens	creeping buttercup
Ranunculus sceleratus	celery leaf buttercup
Rhamnus purshiana	cascara
Ribes divaricatum	coast black gooseberry
Ribes lacustre	swamp gooseberry
Ribes laxiflorum	trailing black currant
Rorippa sp.	yellow cress
Rosa nutkana	Nootka rose
Rosa sp.	rose
Rubus discolor	Himalayan blackberry
Rubus laciniatus	evergreen blackberry
Rubus spectabilis	salmonberry
Rubus ursinus	trailing blackberry
Rumex sp.	dock
Salix hookeriana	Hooker willow
Salix lucida ssp. *lasiandra*	Pacific willoa
Sambucus racemosa	red elderberry
Scilla nonscripta	English bluebell
Scirpus microcarpus	small-fruited bulrush
Senecio jacobaea	tansy ragwort
Sonchus oleraceus	common sowthistle
Spergularia rubra	red sandspurry
Spiraea douglasii	Douglas' spirea
Stachys mexicana	Mexican hedge nettle
Stellaria calycantha	northern starwort

Angiosperms (Continued)

Stellaria crispa	crisp starwort
Stellaria media	chickweed
Taraxacum officinale	dandelion
Tellima grandiflora	fringecups
Tolmiea menziesii	piggy-back plant
Trifolium repens	white clover
Teesdalia nudicaulis	shepherd's cress
Ulex europaeus	gorse
Urtica dioica	stinging nettle
Vaccinium ovatum	evergreen huckleberry
Vicia gigantea	giant vetch
Vicia sativa	common vetch

FORT CLATSOP NATIONAL MEMORIAL, DRAFT PLANT SPECIES LIST 7/5/2001 , RDUA SITE: T7N R10W S1 AND T8N R10W S36

Exotic Species

Callitriche stagnalis	Pond waterstarwort
Chrysanthemum leucanthemum	Oxeye daisy
Cirsium vulgare	Bull thistle
Convolvulus sepium	Morning glory
Cytisus scoparius	Scotch broom
Digitalis purpurea	Foxglove
Erechtites minima	Coast burnweed
Festuca arundinacea	Tall fescue
Hedera helix	English ivy
Holcus lanatus	Velvet grass
Hypochaeris radicata	Hairy catsear
Ilex aquifolium	English holly
Iris pseudacorus	Yellow iris
Laurus nobilis	Laurel
Lonicera sp.	Honeysuckle
Lotus corniculatus	Birdsfoot trefoil
Myosotis discolor	Changing forget-me-not
Narcissus sp.	Daffodil
Parentucellia viscosa	Parentucellia
Phalaris arundinacea	Reed canarygrass
Plantago lanceolata	Narrowleaf plantain
Prunus sp.	plum
Ranunculus repens	Creeping buttercup
Rosa sp.	Rose
Rubus discolor	Himalayan blackberry
Rubus laciniatus	Evergreen blackberry
Rumex sp.	Dock
Scilla nonscripta	English bluebell
Senecio jacobaea	Tansy ragwort
Sonchus oleraceus	Common sowthistle

Exotic Species (Continued)

Spergularia rubra	Red sandspurry
Stellaria media	Chickweed
Taraxacum officinale	Dandelion
Teesdalia nudicaulis	Shepherd's cress
Trifolium repens	White clover
Ulex europaeus	Gorse
Vicia sativa	Common vetch

Oregon Department of Agriculture Noxious Weeds—Gorse, Scotch broom, and English ivy.

SMALL MAMMAL SURVEY RESULTS, RDUA SITE: T7N R10W S1 AND T8N R10W S36 (RIVER DAY-USE AREA), SURVEY DATES: 5/29/2001 TO 6/1/2001

50 live traps were placed along an approximately 1/4 mile segment of riparian habitat from the northern end of the RDUA paved area north into the forested portion of the river dike. Traps were baited each evening and checked the following morning. All animals were released after being weighed, sexed and marked for recapture information, with the exception of three shrews that didn't survive the procedure.

Species		Number Trapped
Creeping vole	*Microtus oregoni*	1
Shrew-mole	*Neurotrichus gibbsii*	1
Deer mouse	*Peromyscus maniculatus*	117
Trowbridge's shrew	*Sorex trowbridgii*	5
Vagrant shrew	*Sorex vagrans*	14
Pacific jumping mouse	*Zapus trinotatus*	8

- **Total Species**—6
- **Total Records**—146
- **Survey Crew**—John Treanor, Brad Buckley, Scott Stonum, and Nancy Eid.

Wildlife Observations at the RDUA Site (River Day-Use Area) during plant species survey, 4/10/2002.

- Northern red-legged frog
- American crow
- American robin
- Double-crested cormorant
- Oregon junco

PORT OF ASTORIA ALTERNATIVE TRANSPORTATION SITE (AIRPORT SITE), DRAFT PLANT SPECIES LIST, T8N R10W S35, SURVEY DATE: 7/25/2001

Perimeter Freshwater Marsh and Upland Areas

Species		Exotic Species
Ferns and Fern Allies		
Athyrium filix-femina	lady fern	
Equisetum telmateia	giant horsetail	
Pteridium aquilinum	bracken	
Angiosperms		
Alnus rubra	red alder	
Anaphalis margaritacea	pearly everlasting	
Callitriche stagnalis	pond waterstarwort	x
Carex obnupta	slough sedge	
Chrysanthemum leucanthemum	oxeye daisy	x
Cirsium vulgare	bull thistle	x
Convolvulus sepium	morning glory	x
Cytisus scoparius	Scotch broom	x
Epilobium sp.	willowherb	
Galium aparine	cleavers	
Heracleum lanatum	cow parsnip	
Holcus lanatus	common velvet grass	x
Hypochaeris radicata	hairy catsear	x
Juncus sp.	rush	
Lotus corniculatus	birdsfoot trefoil	x
Lysichiton americanum	skunk cabbage	
Parentucellia viscosa	parentucellia	x
Phalaris arundinacea	reed canarygrass	x
Plantago lanceolata	narrowleaf plantain	x
Potentilla anserina pacifica	Pacific silverweed	
Ranunculus repens	creeping buttercup	x
Rubus discolor	Himalayan blackberry	x
Rubus laciniatus	evergreen blackberry	x
Rubus spectabilis	salmonberry	
Rubus ursinus	trailing blackberry	
Rumex crispus	curled dock	x
Rumex obtusifolius	broadleaved dock	x
Salix hookeriana	Hooker willow	
Salix lucida ssp. *lasiandra*	Pacific willow	
Sambucus racemosa	red elderberry	
Scirpus microcarpus	small-fruited bulrush	
Sonchus asper	prickly sowthistle	x
Spiraea douglasii	Douglas' spirea	
Stachys mexicana	Mexican hedge nettle	
Stellaria calycantha	northern starwort	

Species		Exotic Species
Angiosperms (Continued)		
Trifolium pratense	red clover	x
Trifolium repens	white clover	x
Vicia sativa	common vetch	x

Interior Filled and Graded Areas

Species		Exotic Species
Ferns and Fern Allies		
Athyrium filix-femina	lady fern	
Equisetum telmateia	giant horsetail	
Pteridium aquilinum	bracken	
Angiosperms		
Alnus rubra	red alder	
Anaphalis margaritacea	pearly everlasting	
Callitriche stagnalis	pond waterstarwort	x
Carex obnupta	slough sedge	
Chrysanthemum leucanthemum	oxeye daisy	x
Cirsium vulgare	bull thistle	x
Convolvulus sepium	morning glory	x
Cytisus scoparius	Scotch broom	x
Epilobium sp.	willowherb	
Galium aparine	cleavers	
Heracleum lanatum	cow parsnip	
Holcus lanatus	common velvet grass	x
Hypochaeris radicata	hairy catsear	x
Juncus sp.	rush	
Lotus corniculatus	birdsfoot trefoil	x
Lysichiton americanum	skunk cabbage	
Parentucellia viscosa	parentucellia	x
Phalaris arundinacea	reed canarygrass	x
Plantago lanceolata	narrowleaf plantain	x
Potentilla anserina pacifica	Pacific silverweed	
Ranunculus repens	creeping buttercup	x
Rubus discolor	Himalayan blackberry	x
Rubus laciniatus	evergreen blackberry	x
Rubus spectabilis	salmonberry	
Rubus ursinus	trailing blackberry	
Rumex crispus	curled dock	x
Rumex obtusifolius	broadleaved dock	x
Salix hookeriana	Hooker willow	
Salix lucida ssp. *lasiandra*	Pacific willow	
Sambucus racemosa	red elderberry	
Scirpus microcarpus	small-fruited bulrush	

Species		Exotic Species
Angiosperms		
Sonchus asper	prickly sowthistle	x
Spiraea douglasii	Douglas' spirea	
Stachys mexicana	Mexican hedge nettle	
Stellaria calycantha	northern starwort	
Trifolium pratense	red clover	x
Trifolium repens	white clover	x
Vicia sativa	common vetch	x
Senecio jacobaea	Tansy ragwort	

WEST COUNTY ALTERNATIVE TRANSPORTATION SITE, DRAFT PLANT SPECIES LIST, T8N R10W S35, SURVEY DATE: 4/10/2002

Upland Areas

Ferns And Fern Allies

Dryopteris austriaca	wood fern
Equisetum telmateia	giant horsetail
Polystichum munitum	sword fern
Pteridium aquilinum	bracken

Gymnosperms

Picea sitchensis	Sitka spruce
Tsuga heterophylla	western hemlock

Angiosperms

Alnus rubra	red alder
Carex obnupta	slough sedge
Cirsium sp.	thistle
Cytisus scoparius	scotch broom
Digitalis purpurea	foxglove
Erectites minima	coast burnweed
Gaultheria shallon	salal
Holcus lanatus	common velvet grass
Lonicera involucrata	twinberry honeysuckle
Luzula sp.	woodrush
Rhamnus purshiana	cascara
Rubus discolor	Himalayan blackberry
Rubus laciniatus	evergreen blackberry
Rubus spectabilis	salmonberry
Rubus ursinus	trailing blackberry
Sambucus racemosa	red elderberry
Spiraea douglasii	Douglas' spirea

Angiosperms (Continued)

Vaccinium ovatum	evergreen huckleberry
Vaccinium parvifolium	red huckleberry

Wetland Areas

Ferns and Fern Allies

Athyrium filix-femina	lady fern
Blechnum spicant	deer fern
Equisetum telmateia	giant horsetail
Polystichum munitum	sword fern

Gymnosperms

Picea sitchensis	Sitka spruce
Tsuga heterophylla	western hemlock

Angiosperms

Alnus rubra	red alder
Cardamine angulata	angled bittercress
Carex obnupta	slough sedge
Claytonia sibirica	candyflower
Ilex aquifolium	English holly
Lonicera involucrata	twinberry honeysuckle
Luzula sp.	woodrush
Lysichiton americanum	skunk cabbage
Oenanthe sarmentosa	water parsley
Ribes laxiflorum	trailing black currant
Rubus discolor	Himalayan blackberry
Rubus spectabilis	salmonberry
Rubus ursinus	trailing blackberry
Sambucus racemosa	red elderberry
Stachys mexicana	Mexican hedge nettle
Stellaria sp.	chickweed
Vaccinium parvifolium	red huckleberry

Observation Notes—4/10/2002 survey encompassed western half of site only. Elk scat, tracks and stripped bark on red alder prevalent throughout area surveyed.

APPENDIX B

NPS BEST MANAGEMENT PRACTICES

APPENDIX B—NPS BEST MANAGEMENT PRACTICES

"Best Management Practices (BMPs)/Conditions" to be Applied When Proposed Actions Have the Potential to Have Adverse Impacts on Wetlands

The following serve as BMPs for NPS actions that may have adverse impacts on wetlands. Additional BMPs may be appropriate depending on local conditions or special circumstances. These also serve as "conditions" that must be met for the actions listed in Section 4.2.A of these procedures to qualify as "excepted."

1. **Effects on Hydrology**—Action must have only negligible effects on site hydrology, including flow, circulation, velocities, hydroperiods, water level fluctuations, and so on.

2. **Water Quality Protection and Certification**—Action is conducted so as to avoid degrading water quality to the maximum extent practicable. Measures must be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway or wetland. Action is consistent with state water quality standards and Clean Water Act Section 401 certification requirements (check with appropriate state agency).

3. **Erosion and Siltation Controls**—Appropriate erosion and siltation controls must be maintained during construction, and all exposed soil or fill material must be permanently stabilized at the earliest practicable date.

4. **Effects on Fauna**—Action must have only negligible effects on normal movement, migration, reproduction, or health of aquatic or terrestrial fauna, including at low flow conditions.

5. **Proper Maintenance**—Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.

6. **Heavy Equipment Use**—Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve preconstruction elevations.

7. **Stockpiling Material**—Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semipermeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. The material must be stabilized with straw bales, filter cloth, or other appropriate means to prevent reentry into the waterway or wetland.

8. **Removal of Stockpiles and Other Temporary Disturbances During Construction**—Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their pre-existing elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable.

9. **Topsoil Storage and Reuse**—Revegetation of disturbed soil areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.

10. **Native Plants**—Where plantings or seeding are required, native plant material must be obtained and used in accordance with NPS policies and guidance. Management techniques must be implemented to foster rapid development of target native plant communities and to eliminate invasion by exotic or other undesirable species.

11. **Boardwalk Elevations**—Minimizing shade impacts, to the extent practicable, should be a consideration in designing boardwalks and similar structures. (Placing a boardwalk at an elevation above the vegetation surface at least equal to the width of the boardwalk is one way to minimize shading.)

12. **Wild and Scenic Rivers**—Action cannot be "excepted" (see Section 4.2 of these procedures) if proposed in a component of the National Wild and Scenic River System or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in official study status.

13. **Coastal Zone Management**—Action must be consistent, to the maximum extent practicable, with state coastal zone management programs.

14. **Endangered Species**—Action must not jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, including degradation of critical habitat (see NPS Management Policies (1988) and guidance on threatened and endangered species).

15. **Historic Properties**—Action must not have adverse effects on historic properties listed or eligible for listing in the National Register of Historic Places.